United States
Department of
Agriculture

Forest Service

Forest
Pest
Management

Washington, DC

October 1992

Forest Insect and Disease Conditions in the United States 1991

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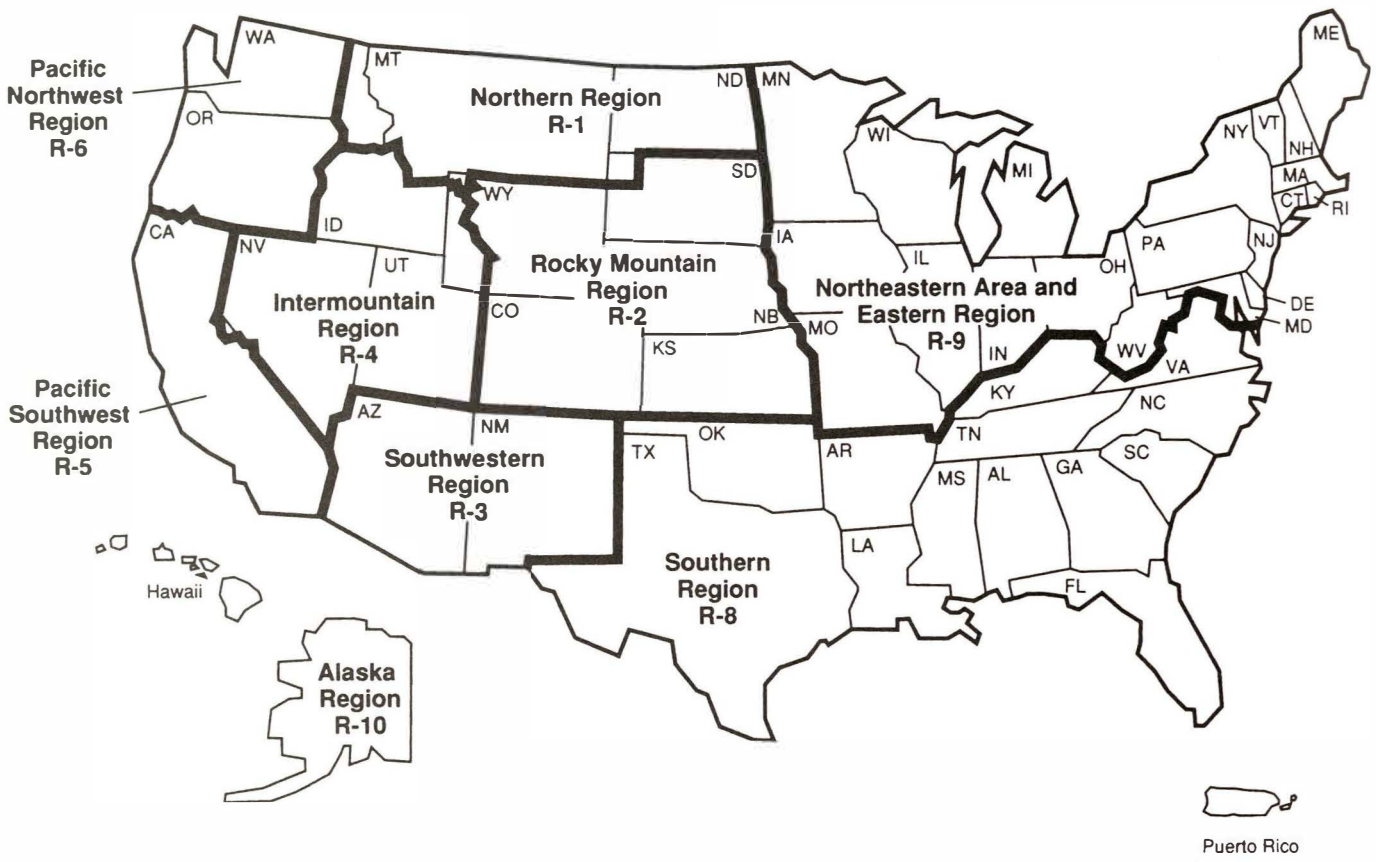
USDA Forest Service Regions and Area



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Cover photo: Mature gypsy moth larva feeding on an oak leaf.

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Introduction

The 1991 report provides an overview of forest insect and disease conditions in the United States.

The report is a three-part publication summarizing the current status of major insect and disease pests in the United States. Part I is a condition summation of 5 major insects and several significant diseases. In Part II, detailed information about pest conditions on all landownerships in the Forest Service Regions is arranged numerically by Region (see map on page ii). The Northern Region (Region 1) is first, and the Alaska Region (Region 10) is last. Each Region has 2 sections: a section on insects followed by a section on diseases. Part III is an index of the common and scientific names of insects and disease-causing organisms found in this report.

Forest Pest Management offices nationwide completed the necessary information for lands of all ownerships.

This is the 41st year that the U.S. Department of Agriculture, Forest Service, Forest Pest Management has published this report. Much of the report is based on special aerial or ground surveys. These surveys record short-term changes in pest activity. The information supplements the tree mortality information gathered in periodic forest resource inventory surveys done by the Forest Service.

We appreciate the assistance of all State, Federal, and private cooperators who provided information for this report.

For additional information about conditions in a particular State, contact one of the following Forest Pest Management staffs:

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Lakewood, CO 80225

Forest Service, USDA
Southwestern Region (R-3)
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Forest Service, USDA
Intermountain Region (R-4)
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324 25th Street
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San Francisco, CA 94111

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Portland, OR 97208

Forest Service, USDA
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1720 Peachtree Road, N.W., Room 925N
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Radnor, PA 19087

Forest Service, USDA
Alaska Region (R-10)
201 E. 9th Avenue, Suite 201
Anchorage, AK 95501

Part 1 National Summary

GYPSY MOTH

Almost 4.2 million acres of trees were defoliated by the gypsy moth (*Lymantria dispar*) in 1991. This is a sharp decrease from the 7.3 million acres reported in 1990. Even with this over all decrease, 7 states and the District of Columbia reported increases in defoliation over 1990. The gypsy moth continues to expand into new areas of Michigan, Ohio, Virginia, and West Virginia.

Gypsy moths defoliated 825 acres in 1924 (first year of our records) and reached over 1 million acres for the first time in 1953 and again in 1971. Between 1971 and 1991, defoliation exceeded 1 million acres 15 times, including 12.9 million acres in 1981.

This year, almost 968 thousand acres of Federal, State, and private lands were treated with *Bacillus thuringiensis* (*B.t.*, a bacteria), dimilin (a growth regulator), and Gypchek (a virus) in efforts to reduce the defoliation.

The gypsy moth continued its south and westward movement. Ohio reported defoliation for the second year. In West Virginia, 12 of 54 counties are regulated under the gypsy moth quarantine. Eighty-four of the 132 independent cities and counties in Virginia are regulated. Two counties in North Carolina, Currituck County and Dare County, are regulated.

Male gypsy moths have been trapped in all 33 eastern states from Maine to Florida and Minnesota, Iowa, Missouri, Oklahoma, and Texas.

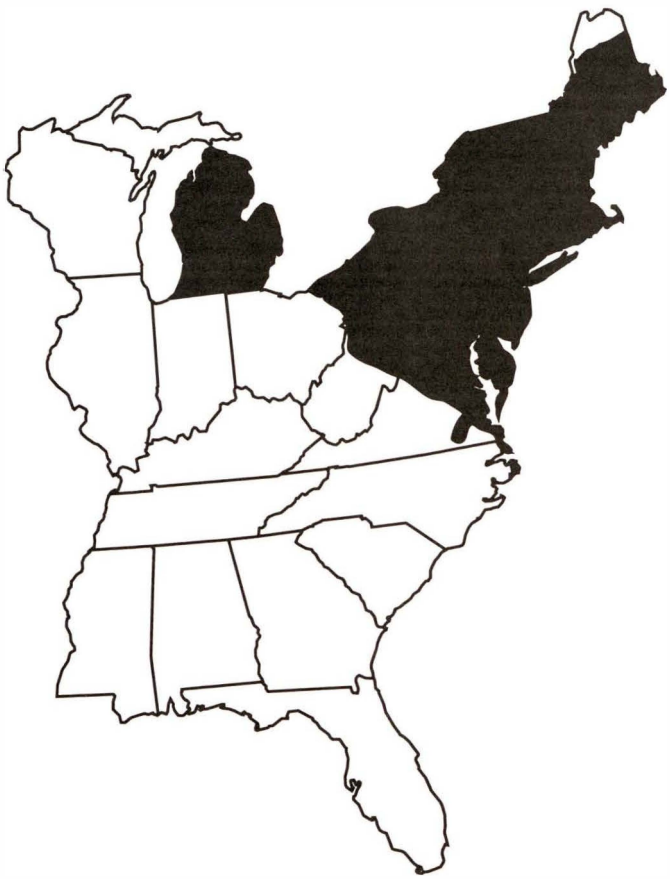
Eradication efforts started in 1989 continued against the 29,900 acre isolated gypsy moth infestation in Salt Lake City, Utah, and nearby areas. The infestation was treated with three applications of *B.t.*

Monitoring continued around the infestation treated in 1987 and again in 1988 that covered 9,000 acres in Clay County, North Carolina. Male moth captures have decreased since the final treatment, and in 1991, zero male moths were captured in 500 pheromone traps deployed in the area. A less intensive monitoring program is planned for 1992.

In Wisconsin, an eradication program continued for the second year. Two applications of *B.t.* were applied on 5,875 acres in Door, Kewaunee, and Manitowoc Counties in the northeastern part of the state.

Elsewhere, eradication programs were carried out against smaller isolated infestations in Illinois, Indiana, Michigan, Minnesota, and Tennessee.

1991 Gypsy Moth Generally Infested Area

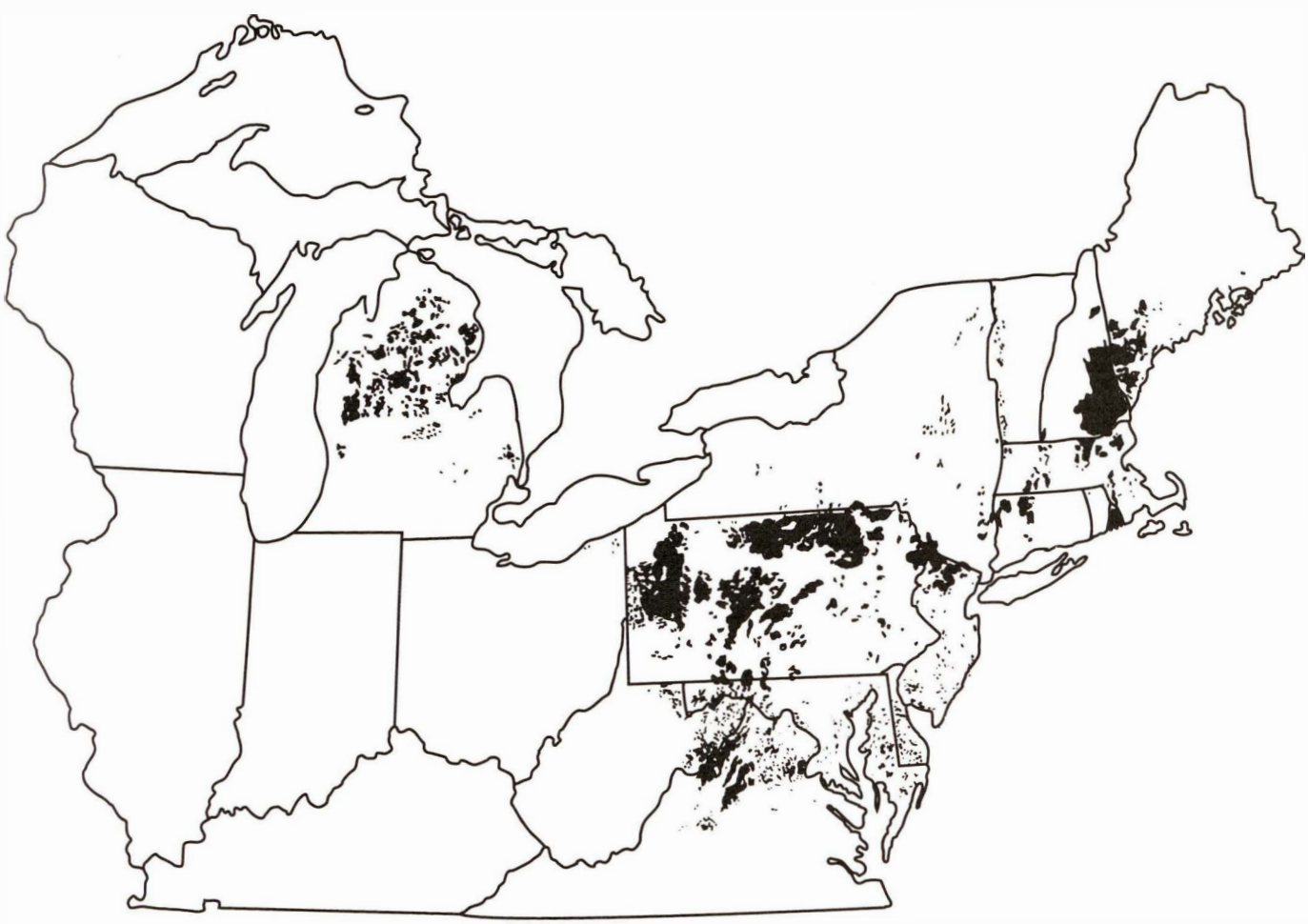


Acres of Aerially Detected Defoliation*

State	1991	1990	1989	1988	1987
Connecticut	50,154	176,576	78,430	1,600	65,400
Delaware	13,475	3,790	1,888	800	2,500
Maine	614,509	270,433	35,000	100	600
Maryland	75,197	133,062	97,911	58,500	76,000
Massachusetts	282,143	83,595	950	0	28,700
Michigan	626,689	358,338	294,344	70,400	39,400
New Hampshire	180,870	133,200	18,395	1,000	300
New Jersey	169,900	431,235	137,310	7,400	95,100
New York	175,960	354,162	421,138	5,700	55,200
Ohio	345	115	0	--	--
Pennsylvania	1,230,066	4,357,700	1,506,790	312,100	880,300
Rhode Island	0	0	0	700	5,100
Vermont	3,596	63,000	27,335	700	0
Virginia	616,200	594,000	289,332	191,000	67,700
Washington, DC	125	10	0	0	12
West Virginia	112,900	345,078	86,736	59,300	12,600
Total	**4,152,129**	**7,304,294**	**2,995,559**	**709,300**	**1,328,912**

*Year 1990 figures for Connecticut, Delaware, West Virginia, and Total have been corrected from the 1990 Forest Insect and Disease Conditions in the United States report

1991 Gypsy Moth Defoliation



1991 Gypsy Moth Eradication Treatment Locations

Southern Pine Beetle

Southern pine beetle (*Dendroctonus frontalis*) activity increased 150 percent in affected acreage in 1991 over 1990. Heaviest tree losses shifted from Texas to Alabama and Mississippi.

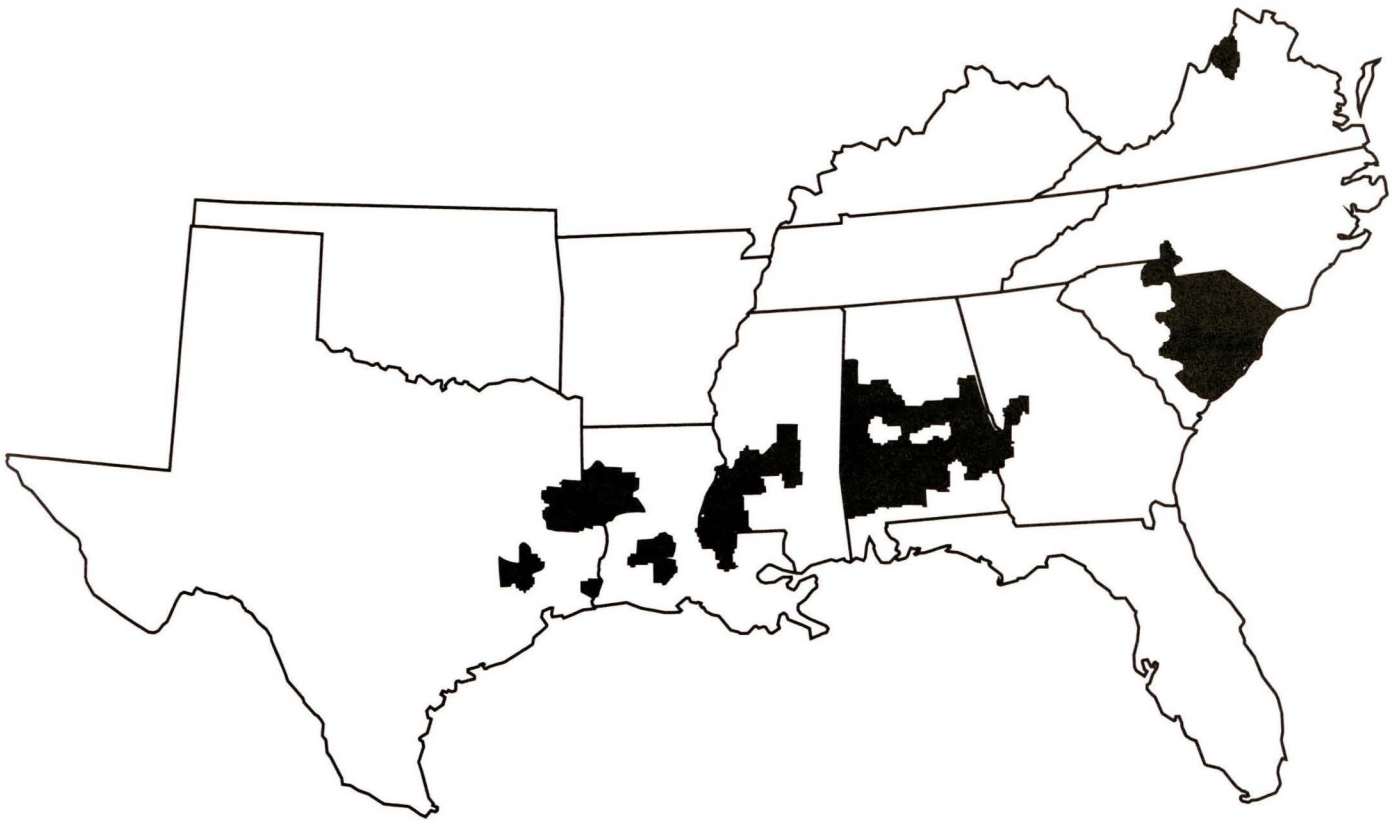
Beetle activity declined significantly in the Costal Plain of South Carolina during 1991. Activity also collapsed in the mountains of Georgia, North Carolina, and Tennessee.

In the Piedmont, populations began building throughout Georgia, North Carolina, and South Carolina in the spring and summer of 1991. Activity in Georgia was heaviest through the center of the state, from Athens west to Fort Benning and Columbus. Current activity was located in South Carolina in an area just north of Columbia to the state line just below Charlotte, North Carolina. Activity in North Carolina is in Mecklenburg County near Charlotte.

Southern pine beetle populations continue to cause significant mortality, particularly in wilderness areas, where the beetle poses a threat to red-cockaded woodpecker colonies. This endangered bird nests in trees which are highly susceptible to attack by the southern pine beetle.

The number of counties classified as "outbreak counties" increased from 32 in 1990 to 77 in 1991. Outbreak counties, listed in the table below, are defined as counties with one or more multiple tree spots per 1,000 acres of host type.

1991 Southern Pine Beetle Outbreak Counties



Southern Pine Beetle Outbreak Counties

Alabama:	Barbour, Bibb, Bullock, Butler, Chambers, Chilton, Choctaw, Clarke, Monroe, Montgomery, Pickens, Randolph, Russell, Sumter, Tallapoosa, Tuscaloosa, Washington, Wilcox
Arkansas:	None
Florida:	None
Georgia:	Chattahoochee, Quitman, Stewart, Talbot, Upson
Kentucky:	None
Louisana:	Acadia, Allen, Evangeline, DeSoto, Natchitoches, Red River, Sabine, East Baton Rouge, East Feliciana, West Feliciana
Mississippi:	Adams, Amite, Claiborne, Copiah, Franklin, Hinds, Jefferson, Leake, Rankin, Scott, Smith, Wilkinson
North Carolina:	Mecklenburg
Oklahoma:	None
South Carolina:	Berkeley, Calhoun, Charleston, Chesterfield, Clarendon, Colleton, Darlington, Dillon, Dorchester, Florence, Georgetown, Horry, Kershaw, Lancaster, Lee, Marion, Marlboro, Orangeburg, Richland, Sumter, Williamsburg, York
Tennessee:	None
Texas:	Angelina, Montgomery, Nacogdoches, Orange, Sabine, San Augustine, San Jacinto, Shelby
Virginia:	Page, Shenandoah

Acres In Outbreak*†

State	1991	1990	1989	1988	1987
Alabama	3,937,100	0	724,000	4,762,400	6,034,000
Arkansas	0	0	0	0	774,000
Georgia	346,500	0	850,000	1,057,400	183,000
Florida	0	0	0	0	0
Kentucky	0	0	0	0	0
Louisiana	1,197,600	0	17,000	17,000	376,000
Mississippi	1,278,400	0	319,000	715,100	1,626,000
North Carolina	40,067	111,358	342,000	497,000	555,000
Oklahoma	0	0	0	0	1,000
South Carolina	2,413,632	2,320,664	753,000	609,100	2,904,000
Tennessee	0	0	427,000	278,100	440,000
Texas	1,495,900	1,800,000	1,901,000	0	475,000
Virginia	35,045	0	0	0	428,000
Total	**10,744,244**	**4,232,022**	**5,333,000**	**7,936,100**	**13,796,000**

*Acres of outbreak are acres of host type having one or more multiple-tree spots per 1,000 acres.
†Year 1990 figures for North Carolina and Total have been corrected from the 1990 Forest Insect and Disease Conditions in the United States report.

Spruce Budworm

Spruce budworm (*Choristoneura fumiferana*) caused light to moderate defoliation on about 108,000 acres in Minnesota in 1991. This was a decline from the 198,000 acres recorded in 1990. No defoliation was reported from the other Lake States: Michigan and Wisconsin.

For the second year in a row, no defoliation was reported from the northeastern states, including Maine, New Hampshire, New York, and Vermont. However, trap catches in both New York and Vermont were higher than last year.

Acres Of Aerially Detected Defoliation

State	1991	1990	1989	1988	1987
Maine	0	0	4,800	65,000	250,000
Michigan	0	2,500	0	0	0
Minnesota	108,000	198,000	140,000	200,000	430,000
New Hampshire	0	0	0	0	0
New York	0	0	0	0	0
Vermont	0	0	0	0	0
Wisconsin	0	0	0	0	0
Total	**108,000**	**200,500**	**144,800**	**265,000**	**680,000**

Mountain Pine Beetle

Mountain pine beetle (*Dendroctonus ponderosae*) occurs almost everywhere lodgepole and ponderosa pines grow in the West. The total acreage affected by the beetle has declined for the past four years; however, increases in affected acreages were reported for some states in 1991. Data for California are not available.

The combined effects of the protracted drought and attack mountain pine beetles have resulted in unprecedented levels of tree mortality in many parts of the West. The drought continued in 1991 in many areas; however, mountain pine beetle activity declined.

Other beetles, such as the Douglas-fir beetle, western pine beetle, *Ips* species, *Scolytus* species, and Jeffrey pine beetle (in California and Nevada), have been the most important mortality agents in some areas, with the mountain pine beetle playing a comparatively minor role, though sometimes acting in concert with these other insects.

Acreage Affected By Mountain Pine Beetle

State	1991	1990	1989	1988	1987
Arizon	0	600	900	600	0
California	NA	NA	NA	0	20,000
Colorado	1,500	9,800	12,000	13,000	2,500
Idaho	22,500	15,200	41,600	42,300	48,061
Montana	160,000	195,200	421,500	546,700	694,380
New Mexico	1,400	800	1,000	1,000	4,790
Oregon	249,600	245,100	887,926	1,311,400	1,400,000
South Dakota	10,000	6,800	2,400	2,600	2,340
Utah	1,300	2,000	4,500	12,500	97,400
Washington	155,400	431,700	231,375	220,300	158,000
Wyoming	15,400	28,300	11,400	55,600	14,700
Total	**617,100**	**935,500**	**1,614,601**	**2,206,000**	**2,442,171**

Number Of Pine Trees Killed By Mountain Pine Beetle*

State	1991	1990	1989	1988	1987
Arizona	30,400	2,000	2,000	620	0
California	974,600	1,265	681,000	0	49,500
Colorado	1,400	8,000	235,000	82,500	54,100
Idaho	39,700	12,000	48,500	64,500	45,068
Montana	704,600	620,000	1,332,500	2,479,700	1,722,503
New Mexico	2,900	4,000	2,000	1,400	1,825
Oregon	160,300	143,000	703,079	2,879,200	2,815,725
South Dakota	33,200	12,000	6,900	7,100	6,500
Utah	1,600	4,000	5,000	21,000	152,076
Washington	298,400	433,000	288,592	224,600	123,464
Wyoming	5,400	37,000	150,600	88,900	10,682
Total	**2,252,500**	**1,276,265**	**3,455,171**	**5,849,520**	**4,981,443**

*Year 1990 total has been corrected from the 1990 Forest Insect and Disease Conditions in the United States report.

1991 Mountain Pine Beetle Outbreak Areas

Western Spruce Budworm

Western spruce budworm (*Choristoneura occidentalis*) defoliation increased for the second consecutive year, from 3.1 million acres in 1989 to 7.2 million acres. The total acreage is still considerably below the 13.2 million acres reported in 1986. Defoliation increased in all infested states except for the Southwest, where declines were reported. No defoliation was visible during aerial surveys in Arizona; however, scattered light defoliation was detected during ground surveys.

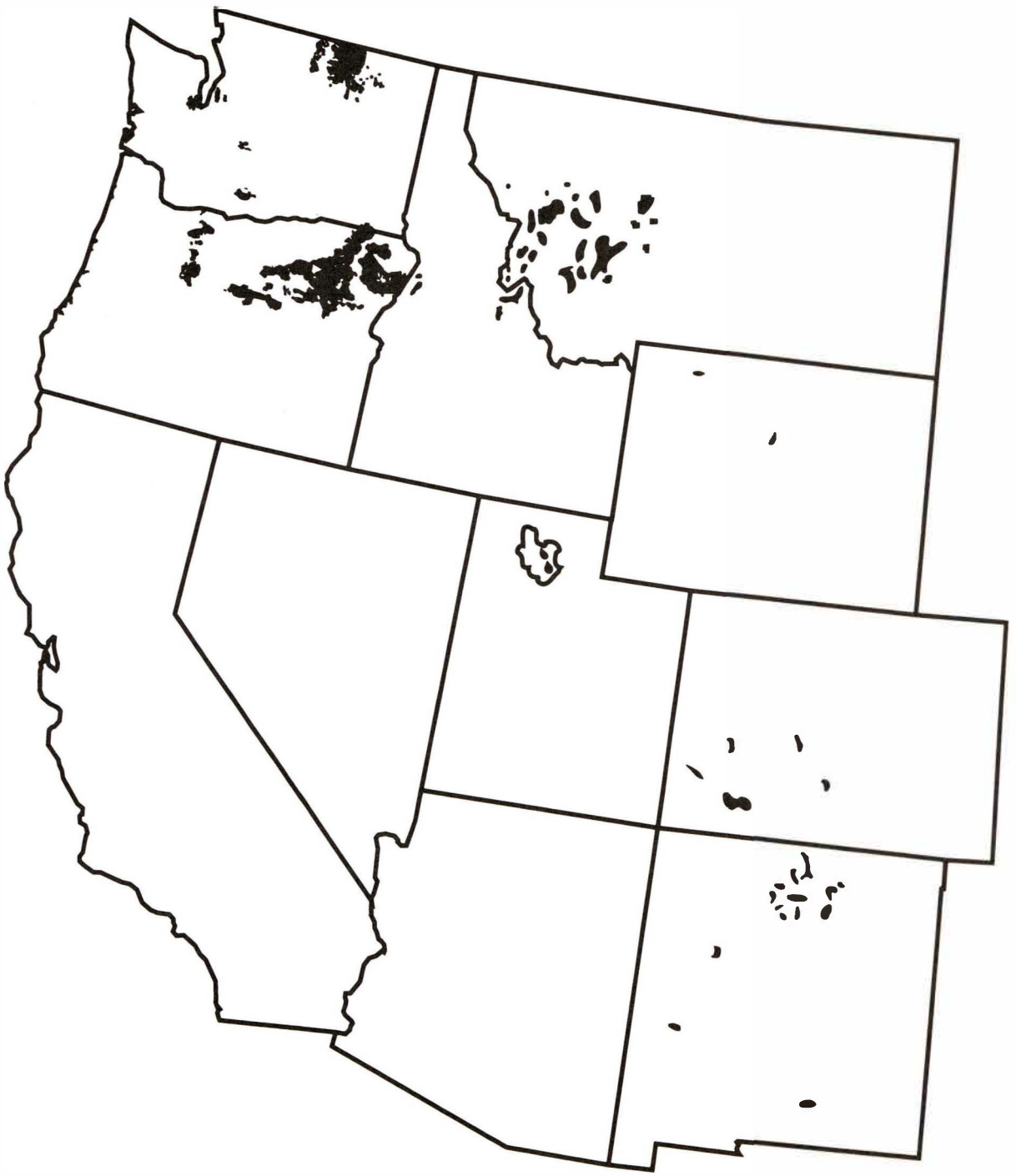
Defoliation increased in all infested areas of Oregon and Washington. The increased acreage in Montana was mostly the result of defoliation of stands along the Continental Divide that were damaged by cold temperatures in January 1989.

Acres Of Aerially Detected Defoliation*

State	1991	1990	1989	1988	1987
Arizona	0	25,600	720	5,800	15,500
California	0	0	0	0	0
Colorado	509,000	52,100	52,000	427,000	833,000
Idaho	61,500	48,000	26,600	61,000	898,200
Montana	1,595,733	1,492,400	1,191,300	2,064,000	1,802,000
New Mexico	218,610	310,500	90,080	477,700	250,400
Oregon	3,724,900	2,344,300	1,416,681	2,740,400	3,700,000
Utah	0	0	0	0	37,700
Washington	1,027,700	351,000	362,251	231,600	400,000
Wyoming	33,500	8,100	0	55,800	16,300
Total	**7,170,943**	**4,632,000**	**3,139,632**	**6,063,300**	**7,953,100**

*Year 1990 figures for Montana and Total have been corrected from the 1990 Forest Insect and Disease Conditions in the United States report, and year 1987 Total has been corrected from the 1998 report.

1991 Western Spruce Budworm Defoliation Areas



Overview of Disease Conditions

Root diseases, stem decays, white pine blister rust, dwarf mistletoes, and fusiform rust continued to be the most damaging diseases of commercially important tree species. In addition, a number of interacting biotic and abiotic factors caused both local and regional tree declines of several eastern hardwood and conifer tree species. These included ash, beech, birch, dogwood, elm, fir, maple, oak, and spruce. Widespread oak decline appeared to be related to a combination of site, weather, tree age, and pest damage factors. Dogwood anthracnose continued its spread and, is of concern because the ultimate distribution and effects of this disease are uncertain.

Root diseases are among the most serious pests in the West and are difficult to control. Approximately 8 percent of the commercial forest land in the Pacific Northwest is affected. Mortality was severe in drought-stricken stands where root diseases and bark beetles work together. In the Northern Region, root diseases caused tree mortality on about 3 million acres. Root diseases interfered with management objectives on numerous other lands in the West.

In the East, root diseases-caused tree mortality occurred in several areas of both conifers and hardwoods, especially areas affected by the recent drought. Southern pine beetle infestations frequently occur in root disease-infected stands.

Stem decays were a problem nationwide on both conifer and hardwood tree species. These diseases greatly reduced the commercial value of trees harvested for wood products and caused tree hazards in recreation areas.

White pine blister rust caused extensive tree mortality to western white and sugar pines in California and Oregon, and to western white pine in Idaho, Montana, and Washington. Rust-resistant planting stock is being used in some areas. Whitebark pine, a grizzly bear food source, was severely damaged in and around Glacier National Park. Damage was more localized and much less severe in other parts of the West. Eastern white pine was much less severely damaged in the north central and eastern states.

Dwarf mistletoes, which are parasitic plants, change in abundance and distribution only gradually over time. Conifers on 22 million acres of western forests are infested. Most of the volume lost from reduced tree growth and mortality is caused by 7 of the 16 dwarf mistletoe species: those on lodgepole pine, Douglas-fir, western larch, true firs, western hemlock, and the two species on ponderosa pine. Dwarf mistletoes are relatively easy to control by removing all infected trees during harvesting.

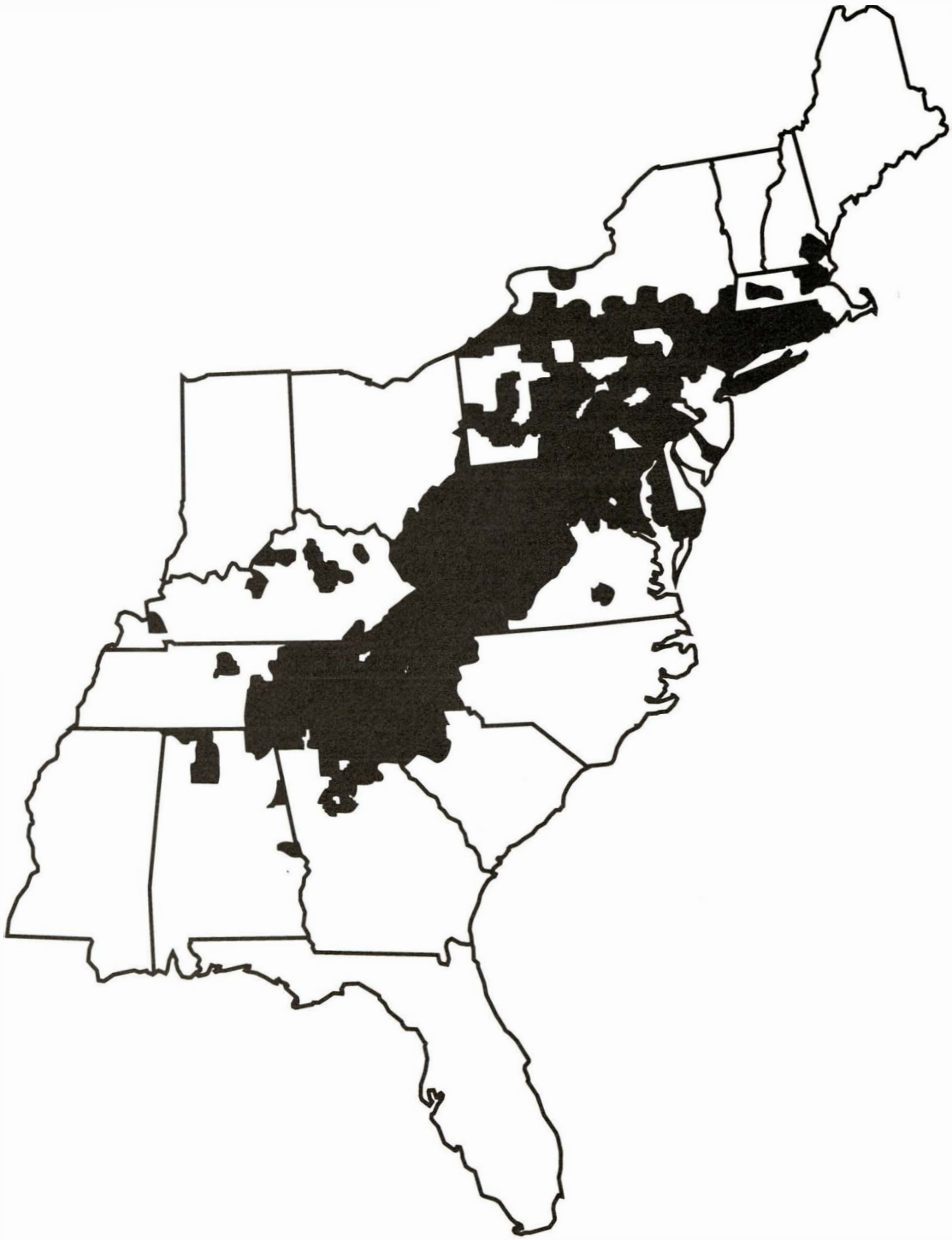
Fusiform rust continued to be the most damaging disease of loblolly and slash pine in the South. About 30 percent of all loblolly and slash pine acres were infected, with at least 10 percent of the trees having a potentially lethal canker. Rust causes an estimated annual loss in excess of $47 million in slash and loblolly pines. Sawtimber losses account for about 89 percent of the total.

Dogwood anthracnose was first discovered in Maryland in 1984. By 1987, the disease was found in nine states from Massachusetts to Georgia. In 1991, the disease was found in 16 states from New Hampshire to Georgia and as far west as Ohio and Tennessee. The disease has killed 100 percent of the trees in some areas, especially in the higher elevations in the South. The tree is prized for it aesthetic value.

Acreage Affected by Fusiform Rust, 1991.

State (survey yr.)	National Forest	Other Federal	State and Private	Total
Alabama (82)	47,281	24,205	2,549,785	2,621,271
Arkansas (88)	0	0	307,378	307,378
Florida (87)	28,814	9,753	1,293,747	1,332,314
Georgia (89)	43,859	125,072	4,813,023	4,981,954
Louisiana (84)	81,938	6,315	1,696,297	1,784,550
Mississippi (87)	212,923	11,813	1,793,769	2,018,505
North Carolina (90)	3,296	14,978	1,098,281	1,116,555
Oklahoma (86)	0	0	22,525	22,525
South Carolina (86)	86,137	58,260	1,696,148	1,840,545
Texas (86)	23,352	0	601,462	624,814
Virginia (86)	0	0	70,534	70,534
Total	**527,600**	**250,396**	**15,942,949**	**16,720,945**

1991 Distribution of Dogwood Anthracnose in the Eastern United States



Part 2 Regional Conditions

Northern Region Insects

Prepared by Lawrence Stipe

Insect	Host	Location	Remarks
Balsam woolly adelgid *Adelges piceae*	Grand fir, Subalpine fir	Idaho	Widespread mortality occurred in balsam woolly adelgid populations in many areas in northern Idaho this year. The cause has not been determined; however, weather conditions may be at least partially responsible. Extreme low temperatures occurred during the winter in some infested areas. Even though populations have been reduced, over 10,000 acres of adelgid-caused subalpine fir mortality was detected by aerial surveys. Most of the damage occurred on the Clearwater National Forest and adjacent State and private land, and on private land in the Craig Mountains south of Lewiston. Gouting is still prevalent on grand fir located adjacent to infested subalpine fir.
Boxelder defoliator *Archips negundanus*	Boxelder	Montana	Missoula's populations of this pest have returned to a sub-outbreak level. Only widely scattered spots of very light defoliation were reported in 1991. Activity in 1992 should remain low, with little or no defoliation expected.
California tortoiseshell *Nymphalis californica*	Snowbrush, Serviceberry	Idaho, Montana	No significant activity was reported in 1991.
Cranberry girdler moth *Chrysoteuchia topiaria*	Douglas-fir, Western larch	Idaho	Girdler moth pheromone trap counts at the Coeur d'Alene nursery were at an all-time high during 1991. Damage in the Douglas-fir and larch seedling beds was kept within an acceptable level by both adult and larval pesticide treatments. Since moths come into the nursery from surrounding grass fields, the risk of damage will remain high. Pheromone traps will be used again in 1992 to monitor the duration and intensity of moth flight.

Northern Region--Status of insects in Montana, northern Idaho, North Dakota, and National Park Service Lands in northwestern Wyoming.

Insect	Host	Location	Remarks
Douglas-fir beetle *Dendroctonus pseudotsugae*	Douglas-fir	Idaho, Montana	Once again, total area affected by Douglas-fir beetle declined region- wide. There were, however, some notable increases in infestation extent and intensity on some Forests. In northern Idaho--specifically on the Idaho Panhandle National Forests--the infested area declined markedly, from more than 8,000 acres in 1990 to slightly more than 5,300 in 1991. An estimated 12,000 trees--nearly 840 thousand cubic feet (MCF)--were killed. In Montana, total infested area remained almost static--9,125 acres in 1990; 8,035 acres in 1991. On the Gallatin National Forests, area infested increased significantly. Throughout affected stands statewide, approximately 10,600 trees were killed. Volume killed was estimated to be 620 MCF. Because of continued dry conditions in eastern Montana and late-season fires, Douglas-fir beetle populations may increase in some parts of the State in 1992.
Douglas-fir tussock moth *Orgyia pseudotsugata*	Douglas-fir, Spruce, True firs	Idaho, Montana	In northern Idaho, pheromone trap counts showed a slight increase during 1991, but averaged well below one moth per trap. Tussock moth activity in northern Idaho has yet to reflect the major outbreak conditions found in the neighboring areas of Region 4 and Region 6. In Montana, trap counts averaged just over six moths per trap. No visible defoliation was reported in either Idaho or Montana. If the northern Idaho outbreak cycle repeats as expected, the next population peak in the Palouse area should occur around 1995.
Fir engraver beetle *Scolytus ventralis*	Grand fir, Subalpine fir	Idaho	Responding to nearly normal precipitation for the third consecutive year, fir engraver beetle populations declined notably again in 1991. In northern Idaho, in 1990, more than 36,000 acres had been infested. An estimated 53,000 trees had been killed. Corresponding 1991 data indicate 14,700 trees were killed on 5,600 acres. In Montana, less than 650 trees were killed on slightly more than 500 acres; a small decrease from infested acres observed in 1990.

Northern Region--Status of insects in Montana, northern Idaho, North Dakota, and National Park Service Lands in northwestern Wyoming.

Insect	Host	Location	Remarks
Forest tent caterpillar *Malacosoma disstria*	Hardwoods	Idaho, Montana	No significant activity was reported in 1991.
Gouty pitch midge *Cecidomyia piniinopis*	Ponderosa pine	Idaho	No significant activity was reported in 1991.
Gypsy moth *Lymantria dispar*	Conifers, Hardwoods	Idaho, Montana, North Dakota, Wyoming	Through several cooperative agreements, land managers within Region 1 deployed over 5,800 pheromone traps as part of an early detection program for the gypsy moth. Traps were concentrated near high-use recreation sites, along major travel routes, and in most urban areas. Eight moths were caught: three in Montana, three in North Dakota, and two in northern Idaho. At each trap site with a catch in 1991, trap density will be increased during the next flight period. A 3-year suppression project to eradicate gypsy moth populations in Coeur d'Alene and Sandpoint, Idaho, was completed in 1990. Following the 1990 treatments and again in 1991, a mass trapping program was conducted in and around the treated areas. No moths were caught either year. As a result, these areas will remain free of any quarantine restrictions.
Larch casebearer *Coleophora laricella*	Western larch	Idaho, Montana	No significant activity was reported in 1991.
Larch looper (Genus and species unknown)	Western larch	Idaho	No significant activity was reported in 1991.
Lodgepole terminal weevil *Pissodes terminalis*	Lodgepole pine	Idaho, Montana	Lodgepole terminal weevil activity remained of significance in small, localized areas--some lodgepole pine plantations in northern Idaho and western Montana. Region-wide, it is not of major importance at the present time.

Insect	Host	Location	Remarks
Mountain pine beetle *Dendroctonus ponderosae*	Lodgepole pine, Ponderosa pine, Other pines	Idaho, Montana	As in past years, the mountain pine beetle remained the most devastating insect in the region. Though infested acres continued the region-wide decline begun in 1982, the decrease in 1991 was less than in previous years. In northern Idaho, there was actually an increase in affected acres--up from 800 in 1990 to more than 3,200 in 1991. Trees killed were estimated at just over 9,200. In Montana, there was a noticeable decrease in infested area. In 1990, more than 198,000 acres had been infested. In 1991, faders were recorded on only 160,000 acres. Approximately 99 percent of the trees killed were lodgepole pines. Volume represented by those dead trees totaled more than 7,020 MCF. The most active infestations continue to be on the Lolo, Kootenai, and Flathead National Forests in northwest Montana. There may a be slight decrease in infested area for the next few years; however, much lodgepole pine remains in the Region that will grow into a susceptible condition within the next 5 to 10 years.
Pine engraver beetle *Ips pini*	Lodgepole pine, Ponderosa pine	Idaho, Montana	Pine engraver beetle populations declined to endemic status in northern Idaho in 1991. A mere 80 dead ponderosa pines, attributed to the beetles, were recorded on 15 acres. In Montana, on the other hand, a continuation of dry conditions in the eastern portion of the state and lingering effects of wide-spread fires in 1988 resulted in increased mortality in both ponderosa and lodgepole pine stands. More than 3,000 acres were affected in the ponderosa pine type--much on the Northern Cheyenne Indian Reservation and adjacent Custer National Forest. An additional 5,000 acres of mortality were recorded in lodgepole pine stands, mostly on the Gallatin National Forest surrounding Yellowstone National Park, and in the Park itself. In both species, more than 6,500 trees were killed.

Northern Region--Status of insects in Montana, northern Idaho, North Dakota, and National Park Service Lands in northwestern Wyoming.

Insect	Host	Location	Remarks
Spruce beetle *Dendroctonus rufipennis*	Engelmann spruce	Idaho, Montana	Though spruce beetle remains virtually endemic throughout the Region, infested area increased in the southwestern portion on parts of the Nez Perce National Forest, Idaho. Engelmann spruce stands in that part of the state are still drier than normal, and are experiencing population increases associated with outbreaks on the Payette National Forest to the south. Infested area increased twofold, from 591 acres in 1990 to almost 1,200 acres in 1991. Just over 1,500 trees were killed. In Montana, only 128 trees were killed on 113 acres. All mortality was in small, widely scattered groups.
Western balsam bark beetle *Dryocoetes confusus*	Subalpine fir	Idaho, Montana	In Idaho, only small groups of subalpine fir mortality attributed to western balsam bark beetle were recorded in 1991. Fewer than 900 trees, on slightly more than 200 acres, were recorded. In Montana, infested acres once again increased on the Gallatin and Beaverhead National Forests. State-wide, but predominantly in the western portion, the infested area increased from 5,500 acres last year to 7,300 in 1991. More than 14,000 trees were recorded as killed by the beetle, which we now believe is a complex of pests, of which western balsam bark beetle is perhaps the most obvious.
Western pine beetle *Dendroctonus brevicomis*	Ponderosa pine	Idaho	Western pine beetle populations and the number of affected ponderosa pine stands once again decreased markedly in 1991 in northern Idaho. In 1990, more than 9,900 acres were still infested. That was reduced to fewer than 2,000 acres in 1991. Slightly more than 6,400 trees were killed by the beetle this past year. More than 46,000 were killed the previous year. In Montana, conditions remained virtually the same: 350 trees killed on 600 acres. Nearly identical figures were recorded in 1990. Most mortality in both states was observed in relatively small, scattered (5- to 10-tree) groups. Because of improved moisture conditions in northern Idaho and western Montana, western pine beetle has returned to a nearly endemic status.

Northern Region--Status of insects in Montana, northern Idaho, North Dakota, and National Park Service Lands in northwestern Wyoming.

Insect	Host	Location	Remarks
Western pine shoot borer *Eucosma sonomana*	Ponderosa pine, Lodgepole pine	Idaho, Montana	No significant activity was reported in 1991.
Western spruce budworm *Choristoneura occidentalis*	Douglas-fir, Engelmann spruce, True firs, Western larch	Idaho, Montana, Wyoming	Budworm-caused defoliation increased from 1,487,790 acres in 1990 to just over 1,607,000 in 1991. Most of this increase occurred in Montana along the Continental Divide in stands damaged by cold temperatures in January of 1989. Budworm populations on the Helena, Lewis and Clark, and Deerlodge National Forests continue to build, but they have not yet reached their pre-1989 levels. Winter storm effects may be greater than once thought. Population recovery in these areas has been slower than expected. The budworm outbreak on the Nez Perce National Forest in northern Idaho increased from 5,400 acres in 1990 to 12,200 acres in 1991. Damaged areas have not changed much since first reported in 1984. Heaviest defoliation has been limited to widely scattered high-elevation true fir stands above the Salmon River near Riggins, Idaho.

Northern Region--Status of insects in Montana, northern Idaho, North Dakota, and National Park Service Lands in northwestern Wyoming.

Northern Region Diseases

Prepared by John Schwandt

Disease	Host	Location	Remarks
Stem and Branch Diseases			
Atropellis canker *Atropellis piniphila*	Lodgepole pine	Idaho, Montana	Atropellis canker was common in poles and sawtimber, and caused defect, top kill, and tree mortality.
Comandra blister rust *Cronartium comandrae*	Lodgepole pine, Ponderosa pine	Idaho, Montana	Comandra rust was present on lodgepole and ponderosa pine in many parts of Idaho and Montana. It was especially severe in Montana forests east of the Continental Divide.
Diplodia blight *Sphaeropsis sapinea* *(=Diplodia pinea)*	Ponderosa pine	Idaho, Montana	This pathogen was associated with branch dieback at many locations in Idaho and Montana. Damage was severe at a number of locations in Montana where tree mortality occurred during the past 6 years. Branch mortality was widespread and increased in northern Idaho.
Dwarf mistletoes			Dwarf mistletoes were present on about 3 million acres, and continued to be one of the major causes of forest damage. Damage changes little from year-to-year. But, over the decades, significant increases have occurred in unmanaged stands as these pathogens slowly spread and intensify. The desire to leave infected residuals at the time of regeneration complicates dwarf mistletoe management.
Arceuthobium americanum	Lodgepole pine	Idaho, Montana	Lodgepole pine dwarf mistletoe infected 2 million acres (28 percent) of the lodgepole type and caused 18 million cubic feet of growth loss.
Arceuthobium campylopodum	Ponderosa pine	Idaho	Locally heavy in ponderosa pine stands around Lake Coeur d'Alene and along the Spokane River drainage.
Arceuthobium douglasii	Douglas-fir	Idaho, Montana	Douglas-fir dwarf mistletoe infected 0.6 million acres (13 percent) of Douglas-fir, and caused 13 million cubic feet of loss.

Northern Region--Status of diseases in Montana, northern Idaho, North Dakota, and National Park Service lands in northwestern Wyoming.

Disease	Host	Location	Remarks
Arceuthobium laricis	Western larch	Idaho, Montana	Western larch dwarf mistletoe occurred on about 0.8 million acres (38 percent) of western larch stands, and caused over 15 million cubic feet of loss.
Stem decays *Phellinus pini* *Echinodontium tinctorium*	Various conifers	Idaho, Montana	Stem decay fungi destroyed large volumes of wood, particularly in old-growth stands. *Phellinus pini* was most damaging to lodgepole pine and western larch, and *Echinodontium tinctorium* caused major losses in grand fir and hemlock stands.
Western gall rust *Endocronartium harknessii*	Lodgepole pine, Ponderosa pine, Scotch pine	Idaho, Montana, North Dakota	Common throughout the range of these pines, this disease caused stem infections resulting in locally severe tree mortality and top kill. Damage was most significant in young stands.
White pine blister rust *Cronartium ribicola*	Western white pine, Whitebark pine	Northern Idaho, Northwestern Montana	White pine blister rust caused extensive tree mortality throughout the range of western white pine, and prevented management of wild-type western white pine on high-hazard sites. Increasing acreage is successfully regenerated each year with rust-tolerant white pine. Whitebark pine, an important food source for grizzly bears, was severely damaged in and around Glacier National Park.
Root Diseases			
			Root diseases were among the most damaging pests in the region. Annually, root diseases cause tree mortality on about 2 million acres in northern Idaho and over 1 million acres in western Montana. Damage has increased greatly since about 1900 due to changing forest conditions.
Annosus root disease *Heterobasidion annosum*	Douglas-fir, Grand fir, Ponderosa pine, Subalpine fir, Western hemlock	Idaho, Western Montana	Annosus root disease was common in ponderosa pine stands on the Flathead Indian Reservation and in other western Montana locations. It was widespread on Douglas-fir and true firs on the Clearwater and the Nez Perce National Forests, and has been found on most Districts on the Idaho Panhandle National Forests.

Northern Region--Status of diseases in Montana, northern Idaho, North Dakota, and National Park Service lands in northwestern Wyoming.

Disease	Host	Location	Remarks
Armillaria root disease *Armillaria spp.*	Douglas-fir, Other conifers	Idaho, Montana	Armillaria root disease was widely distributed in northern Idaho and western Montana. Increased root disease is attributed, in part, to the increase in Douglas-fir and true firs resulting from fire control and selective harvesting of high-value pine and western larch early in the 20th Century. It is also a major cause of mortality in young ponderosa pine plantations (preferentially killing improperly planted trees).
Black stain root disease *Ceratocystis wageneri* *[Verticicladiella wageneri]*	Douglas-fir, Lodgepole pine, Ponderosa pine	Idaho, Montana	Black stain root disease was less common than other root pathogens, and its importance is unknown.
Laminated root rot *Phellinus weirii*	Douglas-fir, Grand fir	Idaho, Montana	Laminated root rot was very severe on parts of the Lolo, Kootenai, and Idaho Panhandle National Forests. It was also found on the Nez Perce National Forest and is frequently associated with other root diseases and insects in pockets of mortality. The increase in damage is attributed to the loss of disease-tolerant western white pine to blister rust, and other factors that have increased the abundance of Douglas-fir and grand fir during the present century.
Schweinitzii butt rot *Phaeolus schweinitzii*	Douglas-fir, Other conifers	Idaho, Montana	Schweinitzii root and butt rot was common on Douglas-fir throughout its range. Damage was mainly due to defect, rather than mortality, although it is frequently found with other root diseases and insects in mortality centers.
Foliage Diseases			
Dothistroma needle blight *Mycosphaerella pini* *[Dothistroma septospora (=Dothistroma pini)]*	Austrian pine, Lodgepole pine, Ponderosa pine, Western white pine	Idaho, Montana	Dothistroma needle blight increased in intensity from the Lochsa River Drainage on the Clearwater National Forest north to Sandpoint. Severe levels of infection were found around Post Falls and Coeur d'Alene.
Douglas-fir needle cast *Rhabdocline pseudotsugae* *Rhabdocline weirii*	Douglas-fir	Idaho, Montana	Needle diseases of Douglas-fir were at endemic levels.

Northern Region--Status of diseases in Montana, northern Idaho, North Dakota, and National Park Service lands in northwestern Wyoming.

Disease	Host	Location	Remarks
Elytroderma needle disease *Elytroderma deformans*	Ponderosa pine	Idaho, Montana	Elytroderma was chronic at certain locations, including the Bitterroot Valley, the Flathead Indian Reservation, around Flathead Lake in Montana, and throughout the range of ponderosa pine in northern Idaho.
Larch needle blight *Hypodermella laricis*	Western larch	Idaho, Montana	Larch needle diseases increased in severity in local areas of northern Idaho and western Montana.
Larch needle cast *Meria laricis*	Western larch	Idaho, Montana	Larch needle diseases increased in severity in local areas of northern Idaho and western Montana.
Lodgepole pine needle cast *Lophodermella concolor*	Lodgepole pine	Idaho, Montana	Lodgepole pine needle cast was widespread but less severe throughout western Montana and northern Idaho. Evaluations were made in several Tree Improvement plantations.
Swiss needle cast *Phaeocryptopus gaeumannii*	Douglas-fir	Idaho, Montana	Swiss needle cast occurred at endemic levels throughout the host range.
White pine needle cast *Lophodermella arcuata*	White pine	Idaho	No significant activity was reported in 1991.
Vascular Wilts and Declines			
Dutch elm disease *ratocystis ulmi*	American elm, Siberian elm	Montana, North Dakota, Idaho	Dutch elm disease continued to spread in urban areas in North Dakota and Montana. Montana's highest losses occurred in Billings and Great Falls. It was found in northern Idaho for the first time on several elms in Moscow in 1990.
Nursery Diseases			
Cylindrocarpon root rot *Cylindrocarpon distructions*	White bark pine	Idaho	The usual nursery diseases were found in Federal, State, and private nurseries in 1991.
Fusarium root rot *Fusarium* spp.	Douglas-fir, Other conifers	Idaho, Montana	Fusarium is typically the most common nursery problem.

Northern Region--Status of diseases in Montana, northern Idaho, North Dakota, and National Park Service lands in northwestern Wyoming.

Disease	Host	Location	Remarks
Gray mold *Botrytis cinerea*	Engelmann spruce, Lodgepole pine, Western larch	Idaho, Montana	No significant activity was reported in 1991.
Larch needle cast *Meria laricis*	Western larch	Idaho	No significant activity was reported in 1991.
Phoma blight *Phoma* spp.	Most conifers	Idaho	No significant activity was reported in 1991.
Phytophthora root rot *Phytophthora* spp. *Phytophthora cactorium*	Engelmann spruce, Western larch	Idaho	No significant activity was reported in 1991.
Sirococcus tip blight *Sirococcus strobilinus*	Engelmann spruce, Ponderosa pine	Idaho, Montana	No significant activity was reported in 1991.
Abiotic Damage			
Winter injury and contributing diseases	All conifers	Idaho, Montana	No significant activity was reported in 1991.

Northern Region--Status of diseases in Montana, northern Idaho, North Dakota, and National Park Service lands in northwestern Wyoming.

Rocky Mountain Region Insects

Prepared by Curtis O'Neil

Insect	Host	Location	Remarks
A willow sawfly *Nematus* sp.	Willow	Wyoming	No significant activity was reported in 1991.
Ash plant bug *Tropidosteptes amoenus*	Green ash	South Dakota	No significant activity was reported in 1991.
Aspen leaf beetle *Chrysomela crotchi*	Aspen	South Dakota	Defoliation was abundant in the central and southern Black Hills.
Balsam twig aphid *Mindarus abietinus*	Balsam fir	South Dakota	No significant activity was reported in 1991.
Birch skeletonizer *Bucculatrix canadensisella*	Birch	South Dakota	Defoliation was moderate in the central and southern Black Hills.
Blackheaded ash sawfly *Tethida cordiger*	Green ash	South Dakota	No significant activity was reported in 1991.
Bronze birch borer *Agrilus anxius*	Paper birch	South Dakota	No significant activity was reported in 1991.
Cankerworms *Alsophila pometaria* *Paleacrita vernata*	Boxelder, Hackberry, Honeylocust, Siberian elm	Kansas, South Dakota	Damage occurred in southeastern Kansas on hackberry and elm trees; elsewhere, damage was low. Fall cankerworm caused 80 percent defoliation on 80 acres in Dewey County, South Dakota.
Common falsepit scale *Lecanodiaspis prosopidis*	Green ash, Hackberry, Red mulberry	Colorado	No significant activity was reported in 1991.
Cottonwood borer *Plectrodera scalator*	Cottonwood	South Dakota	No significant activity was reported in 1991.

Rocky Mountain Region--Status of insects in Colorado, Kansas, Nebraska, South Dakota, and central and eastern Wyoming.

Insect	Host	Location	Remarks
Dioryctria moths *Dioryctria ponderosae* *D. tumicolella* *Dioryctria* sp.	Austrian pine, Pinyon pine, Ponderosa pine, Scots pine	Colorado, Nebraska, South Dakota	This pest continued to be a serious problem throughout most of Nebraska and South Dakota. *Dioryctria* sp., in conjunction with twig beetles, are causing pinyon mortality and branch dieback in southern Colorado.
Douglas-fir beetle *Dendroctonus pseudotsugae*	Douglas-fir	Colorado, Wyoming	On the Shoshone National Forest in Wyoming, beetles spread from trees blackened by the 1988 Clover Mist Fire to nearby scorched and green trees. About 2,500 trees were infested in 1991 at Sugarloaf Mountain, Camp Creek, Upper-Reef Creek, Cathedral Cliffs, Squaw Creek, Russell Peak, and Pahaska Tepee. The epidemic is expected to increase in 1992. Douglas-fir beetle is generally decreasing in Colorado, but scattered infestation spots still occur along the Colorado Front Range.
Elm calligrapha *Calligrapha scalaris*	Siberian elm	South Dakota	No significant activity was reported in 1991.
Elm leaf beetle *Pyrrhalta luteola*	American elm, Siberian elm	Kansas, Nebraska, South Dakota	Several windbreaks in western Kansas were severely damaged, but populations were normal throughout the rest of the state. Moderate defoliation occurred throughout most of Nebraska and South Dakota. Severe defoliation occurred in Yankton, South Dakota.
European pine sawfly *Neodiprion sertifer*	Pine	Kansas	No significant activity was reported in 1991.
Fall webworm *Hyphantria cunea*	Cottonwood, Wild plum	Colorado Wyoming	In Colorado, drainages on the Front Range were infested. Scattered pockets occurred on the Medicine Bow National Forest in Wyoming.
Flea beetle *Altica* sp.	Cottonwood	Colorado	Moderate defoliation occurred along the Gunnison River west of Gunnison.

Insect	Host	Location	Remarks
Gypsy moth *Lymantria dispar*	Hardwoods	Colorado, Nebraska, South Dakota, Wyoming	In Nebraska, infested stock shipped from Pennsylvania was distributed to sites around Omaha and Fremont, Nebraska. Single moth catches occurred in traps at Lincoln, Beatrice, and the Nebraska National Forest near Valentine. In South Dakota, single moth catches occurred in survey traps in campgrounds near Spearfish and in Rockerville. No moths were detected in delimitation traps in Keystone and west of Custer, South Dakota. In Wyoming, a moth was caught in a survey trap in Tensleep Canyon on the Bighorn National Forest. No moths were caught in Colorado.
Hackberry galls *Pachypsylla celtidismamma* *P. celtidisversicula*	Hackberry	South Dakota	No significant activity was reported in 1991.
Honeysuckle aphid *Hyadaphis tataricae*	Honeysuckle	South Dakota	Damage continued statewide.
Lilac borer *Podosesia syringae*	Green ash, Lilac	Nebraska, South Dakota	No significant activity was reported in 1991.
Mountain pine beetle *Dendroctonus ponderosae*	Limber pine, Lodgepole pine, Ponderosa pine	Colorado, South Dakota, Wyoming	Mountain pine beetle in ponderosa pine continued to be the most severe pest in Region 2. In lodgepole pine, mountain pine beetle was endemic. In Colorado, an outbreak on the Uncompahgre Plateau decreased in 1991, but remains a problem. About 1,400 trees were reported killed during aerial surveys. In South Dakota, tree mortality increased significantly in the Black Hills. Nearly 11,000 acres were infested, accounting for 33,000 killed trees. In Wyoming, mortality of limber pine was apparent in Tensleep Canyon on the Bighorn National Forest. An outbreak continued in the northern Medicine Bow National Forest at Laramie Peak. The infestation increased in 1990,but was static in 1991. The infested area is about 11,000 acres.
Pandora moth *Coloradia pandora*	Ponderosa pine	South Dakota	Adults were abundant in Custer, South Dakota, having developed from a small outbreak first detected in the southern Black Hills in 1989.

Rocky Mountain Region--Status of insects in Colorado, Kansas, Nebraska, South Dakota, and central and eastern Wyoming.

Insect	Host	Location	Remarks
Pine engraver beetle *Ips pini*	Jack pine, Lodgepole pine, Ponderosa pine	Colorado, Nebraska, South Dakota, Wyoming	Infestations continued to be abundant in ponderosa pine throughout most of the Black Hills in South Dakota and Wyoming. Beetle activity in lodgepole pine was detected in fresh blowdown material that resulted from a spring microburst windstorm on the Bighorn National Forest.
Pine sawfly *Neodiprion autumnalis*	Ponderosa pine	South Dakota, Wyoming	Outbreaks continued for the second and third year in some areas of South Dakota and Wyoming. Heavy defoliation was detected between Spearfish and Belle Fourche and other outlying towns on the east edge of the Black Hills. In Wyoming, populations southeast of Gillette collapsed in 1991, but defoliation north of Gillette was heavy.
Pine tip moths *Rhyacionia bushnelli*	Austrian pine, Pinyon pine, Ponderosa pine, Scots pine	Colorado, Kansas, Nebraska, South Dakota	Damage was light on Christmas tree plantations and nurseries. Young pines in windbreak and landscape plantings continued to be damaged throughout the plains and in metro areas of Colorado. Pine regeneration in the central and southern Black Hills of South Dakota was heavily damaged.
Pinyon pitch-nodule moth *Retinia arizonensis*	Pinyon pine	Colorado	No significant activity was reported in 1991.
Red turpentine beetle *Dendroctonus valens*	Ponderosa pine	South Dakota	Populations were heavy in standing stumps resulting from tornado damage in the southern Black Hills and in timber sale areas in northeastern Black Hills. Little tree mortality expected.
Roundheaded pine beetle *Dendroctonus adjunctus*	Ponderosa pine	Colorado	Populations continued on the Uncompahgre Plateau in conjunction with mountain pine beetle and western pine beetle.
Spruce beetle *Dendroctonus rufipennis*	Engelmann spruce	Colorado, Wyoming	No reports of problems in Colorado. A few areas of spruce blowdown and timber sales were monitored for activity. In Wyoming, low population levels were present near burned and wind thrown areas.

Insect	Host	Location	Remarks
Tent caterpillars *Malacosoma americanum* *M. californicum* *M. disstria*	Chokecherry, Hardwoods, American plum	South Dakota	Defoliation was heavy in wooded draws in the Black Hills of South Dakota and Wyoming.
Twig beetles *Pityophthorus* sp.	Pinyon pine	Colorado	Twig beetles in association with dioryctria moths are causing mortality and branch dieback in southern Colorado.
Uglynest caterpillar *Archips cerasivorana*	Chokecherry	South Dakota	No significant activity was reported in 1991.
Walnut caterpillar *Datana integerrima*	Pecan, Walnut	Kansas	Defoliation damage continued in the eastern part of the state; 1990 defoliation was the worst on record.
Western pine beetle *Dendroctonus brevicomis*	Ponderosa pine	Colorado	Some populations of western pine beetle are still associated with roundheaded pine beetle and the mountain pine beetle outbreak on the Uncompahgre Plateau.
Western spruce budworm *Choristoneura occidentalis*	Douglas-fir, Engelmann spruce, Subalpine fir, White fir	Colorado, Wyoming	In Colorado, budworm acreage is estimated at 509,000 acres. Moderate to heavy defoliation occurred on the San Isabel, Rio Grande, Gunnison, White River, and Pike National Forests. These outbreaks are expected to continue in 1992. In Wyoming, heavy defoliation continued on 6,500 acres of Bureau of Land Management lands southwest of Buffalo, and light to moderate defoliation reappeared on 10,000 acres in the Sunlight Basin on the Shoshone National Forest.
White pine weevil *Pissodes strobi*	Colorado blue spruce	Colorado	White pine weevil damage to spruce leaders continued at a static level in south and central Colorado.

Rocky Mountain Region--Status of insects in Colorado, Kansas, Nebraska, South Dakota, and central and eastern Wyoming.

Rocky Mountain Region Diseases

Prepared by Curtis O'Neil

Disease	Host	Location	Remarks
Stem and Branch Diseases			
Ash heartrot *Perenniporia fraxinophola*	Green ash	South Dakota	Becoming more common in campgrounds and declining woody draws that are being grazed.
Black knot *Apiosporina morbosum*	Chokecherry	South Dakota	Numerous shelterbelt plantings in north-central South Dakota are badly infected.
Comandra blister rust *Cronartium comandrae*	Lodgepole pine	Colorado, Wyoming	Continues as one of the major diseases on the Shoshone and Medicine Bow National Forests, Wyoming. The disease is present in northern Colorado and western South Dakota but causes no significant damage.
Dwarf mistletoes *Arceuthobium americanum*	Lodgepole pine	Colorado, Wyoming	Dwarf mistletoes cause the greatest disease losses in Region 2. Losses equal at least 10 million cubic feet annually. In Colorado, 50 percent of the lodgepole pine type is infected. Forest Health Management funded presuppression surveys on 12,697 acres on four National Forests and silvicultural control on 2,814 acres on five National Forests.
Arceuthobium douglasii	Douglas-fir	Colorado	Occurs mostly in the southern two-thirds of the state. No suppression projects were funded by Forest Pest Management in 1991.
Arceuthobium vaginatum subsp. *cryptopodum*	Ponderosa pine	Colorado	Losses amount to 885,000 cubic feet annually. Caused light to severe problems in the southern Ute Reservation and was a factor affecting management on the Uncompahgre National Forest.
Arceuthobium divaricatum	Pinyon pine	Colorado	A minor problem in western Colorado.

Rocky Mountain Region--Status of diseases in Colorado, Kansas, Nebraska, South Dakota, and central and eastern Wyoming.

Disease	Host	Location	Remarks
Poplar shoot blight *Venturia macularis*	Cottonwood	South Dakota	Several shelterbelts were infected.
Western gall rust *Endocronartium harknessii*	Lodgepole pine, Ponderosa pine	Colorado, Nebraska, South Dakota	Widespread throughout Region 2. Mostly low to moderate incidence, but heavy in some spots.
White pine blister rust *Cronartium ribicola*	Limber pine	Wyoming, South Dakota	Moderately severe outbreak occurred on the Bighorn National Forest. It was reported for the first time in South Dakota.
Canker Diseases			
Botryodiplodia sp.	Juniper	Kansas	No significant activity was reported in 1991.
Botryosphaeria stevensii	Eastern redcedar, Rocky Mountain juniper	Kansas, Nebraska	No significant activity was reported in 1991.
Cytospora canker *Cytospora* spp.	Aspen, Birch, Cherry, Colorado blue spruce, Lilac, Mountain ash, Rose, Russian olive	Colorado, Kansas, Nebraska, South Dakota, Wyoming	Reported on blue spruce in windbreaks and landscape plantings throughout the Region. Common and damaging on hardwoods in Wyoming and South Dakota. Common on aspen throughout Colorado, where it is a management concern in campgrounds on the San Isabel National Forest.
Russian olive canker *Phomopsis* sp., *Tubercularia* sp. or *Lasiodiplodia* sp.	Russian olive	Kansas, Nebraska, South Dakota, Wyoming	Diseases caused by these fungi were especially severe in South Dakota and eastern Kansas during 1990. In other states, its status was not noted to be different than in previous years.
Siberian elm canker *Botryodiplodia hypodermia* *Tubercularia ulmea*	Siberian elm	Colorado, Nebraska, South Dakota, Wyoming	Elm decline continued to be severe in eastern Wyoming; northern, western, and southwestern Nebraska; and southern and western South Dakota.

Rocky Mountain Region--Status of diseases in Colorado, Kansas, Nebraska, South Dakota, and central and eastern Wyoming.

Disease	Host	Location	Remarks
Thyronectria canker *Thyronectria austro-americana*	Honeylocust	Colorado, Kansas, Nebraska, South Dakota, Wyoming	Widespread in windbreaks and landscape trees. In South Dakota, the disease was especially severe in the town of Hot Springs. In Kansas, about 100 acres of windbreaks were affected in the western part of the state. In Nebraska, it occurred throughout the state, but was not considered threatening.
Root Diseases			
Annosus root disease *Heterobasidion annosum*	Ponderosa pine, White fir	Colorado, Nebraska	Permanent plots were installed in mixed conifer stands on the Southern Ute Indian Reservation to monitor the disease, where it has an impact on management of stands. Reported on the San Juan National Forest also.
Armillaria root disease *Armillaria* spp.	Engelmann spruce, Lodgepole pine, Ponderosa pine, Subalpine fir	Colorado, South Dakota, Wyoming	In South Dakota, several new disease sites were found in the Black Hills National Forest; permanent plots were installed to monitor the disease's activity. Widespread mortality to Black Hills spruce occurred. The most common root disease in Colorado, it affected management of mixed conifer stands on the Ute Indian Reservation. The disease was also noted on pinyon pine in southcentral Colorado.
Black stain root disease *Ophiostoma wageneri* (=*Ceratocystis wageneri*)	Pinyon pine, Ponderosa pine	Colorado	Continues to occur on ponderosa pine in interior portions of Colorado and on pinyon pine in the southwestern corner of the state.
Foliage Diseases			
Anthracnose *Gnomonia leptostyla* *Apiognomonia veneta* (=*Gnomonia platani*)	Walnut	Kansas	No significant activity was reported in 1991.
	Sycamore	Colorado, Kansas, Wyoming	Severe in Kansas, 100 acres were affected in the northern part of the state. Widespread in Nebraska, but not unusually severe. In Colorado, it was reported at locations in the southeastern and southwestern parts of the state.

Disease	Host	Location	Remarks
Ash rust *Puccinia sparganioides*	Green ash	Kansas, Nebraska, South Dakota	No significant activity was reported in 1991.
Brown spot needle blight *Scirrhia acicola*	Scots pine	Kansas, Nebraska	No significant activity was reported in 1991.
Cedar apple rust *Gymnosporangium juniperi-virginianae*	Apple species, Eastern redcedar	Colorado, Kansas, Nebraska, South Dakota, Wyoming	Occasional occurrence in Kansas and Wyoming. Widespread in Nebraska, especially in the eastern part of the state, but intensity during 1991 remained low. In South Dakota, apple leaves were severely spotted, but the incidence of galls on cedar was much less than 1989.
Cercospora blight of juniper *Cercospora sequoiae*	Eastern redcedar, Rocky Mountain juniper	Nebraska, South Dakota	The disease remains one of the major concerns in windbreaks in Nebraska. In South Dakota, the disease was occasionally found in windbreaks, but it was not unsually severe except on a few shelterbelts in the south central area.
Diplodia blight *Sphaeropsis sapinea* (=*Diplodia pinea*)	Austrian pine, Ponderosa pine	Kansas, Nebraska, South Dakota,	Damage increased in Kansas, especially in urban and recreation plantings, where 300 acres were affected. In Nebraska and South Dakota, blight was less severe than usual.
Dothistroma needle blight *Scirrhia pini*	Austrian pine	Nebraska	Continues as a problem in Christmas tree plantations and windbreaks.
Fire blight *Erwinia amylovora*	Apple species, Cotoneaster, Crabapple	Colorado, South Dakota, Wyoming	Damage was somewhat lighter throughout the region in 1991 than 1990.
Leaf shothole *Cylindrosporium* sp.	Black cherry, Chokecherry	Nebraska, South Dakota	This disease was severe in Bessey Nursery in Nebraska and Big Sioux Nursery in South Dakota.
Marssonina blight *Marssonina populi* *Ciborinia whetzelli*	Aspen	Colorado, South Dakota, Wyoming	In South Dakota, extremely heavy on susceptible varieties in shelterbelts and nurseries. In Wyoming and Colorado, low to moderate severity.
Melampsora leaf rust *Melampsora* spp.	Aspen	South Dakota	Foliage discoloration was in scattered pockets throughout Black Hills in late summer.

Rocky Mountain Region--Status of diseases in Colorado, Kansas, Nebraska, South Dakota, and central and eastern Wyoming.

Disease	Host	Location	Remarks
Needle casts *Lophodermella concolor* *Lophodermella montivaga*	Lodgepole pine	Colorado	No significant activity was reported in 1991.
Septoria leaf spot *Septoria caraganae*	Caragana	South Dakota	Numberous shelterbelts throughout the state were defoliated in later summer. Little long-term effect is expected.

Vascular Wilts and Declines

Ash decline	Green ash	Colorado	Mostly in urban areas. First recognized three years ago. Cause unknown.
Dutch elm disease *Ceratocystis ulmi*	Elm species	Colorado, Kansas, Nebraska, South Dakota, Wyoming	Regionwide. In Kansas and Nebraska, the disease is a continuing problem. In South Dakota, it continued to kill the remaining elm population at a rate of 10 percent per year; was most severe in the eastern part of the State. In Wyoming, it was widespread and still a problem in urban areas, especially around Casper and Wheatland. In Colorado, it was a significant problem in cities that have no active Dutch elm disease management program.
Oak wilt *Ceratocystis fagacearum*	Oak species	Kansas, Nebraska	In Kansas, this disease is spreading slowly eastward (50 acres of newly infected stands were reported). In Nebraska, the disease was reported in the southern and eastern counties near the Missouri River, but the incidence or spread did not seem to be increasing.
Pine wood nematode *Bursaphelenchus xylophilus*	Scots pine	Kansas, Nebraska	In Kansas, damage was limited to two counties along the eastern border (50 acres were effected). In Nebraska, no new occurrences have been noted since 1989.

Abiotic Damage

Chemical damage	Many hardwood species	Colorado, Kansas, Nebraska, South Dakota, Wyoming	In South Dakota and Wyoming, herbicide damage was the most commonly reported tree disorder. In Colorado, this has been a continuing problem. In Kansas, however, incidence of herbicide damage was much less pronounced than in previous years.

Disease	Host	Location	Remarks
Drought, other unknown agents	Black walnut, Blue spruce, Buffaloberry, Dogwood, Green ash, Pear, Ponderosa pine, Poplar, Russian olive, Siberian elm, Silver maple	Colorado, Nebraska, South Dakota, Wyoming,	Generally, long-term and secondary effects of previous dry years are appearing in trees. The increased incidence of some stress-related diseases, like Cytospore canker in Wyoming and Siberian elm canker, is probably related to preceding drought conditions.
Frost damage	Hardwoods	South Dakota	New buds of trees in the northeast corner of South Dakota suffered from frost damage. Trees recovered by midsummer. Bur oak was most severly affected.
High water damage	Ponderosa pine	Colorado	No significant activity was reported in 1991.
Winter drying injury	Lodgepole pine	Wyoming	Extensive damage occurred in areas of the Bighorn National Forest in Wyoming.
Other Damage			
Porcupine feeding	Lodgepole pine, Ponderosa pine	Colorado, South Dakota	Reported heavy in the Black Hills National Forest. In Wyoming, damage was observed in association with white pine blister rust.
Sprout dieback	Aspen	Colorado	Regeneration failure and dieback occurred on the Grand Mesa, Uncompahgre Gunnison, San Juan, and Routt National Forests.
Squirrel damage	Hackberry, Honeylocust, Maples, Ponderosa pine, Russian olive, Siberian elm	South Dakota	Reported heavy throughout the state. Trees up to six inches in diameter had bark stripped from branches and boles.

Rocky Mountain Region--Status of diseases in Colorado, Kansas, Nebraska, South Dakota, and central and eastern Wyoming.

Southwestern Region Insects

Prepared by Michelle S. Frank

Insect	Host	Location	Remarks
Douglas-fir beetle *Dendroctonus pseudotsugae*	Douglas-fir	Arizona, New Mexico	Douglas-fir beetle activity increased significantly Region-wide, from a total of 700 acres in 1990 to 2,780 acres in 1991. Both individual and small-group tree mortality (2 to 10 trees) occurred on the Apache-Sitgreaves, Coconino, Coronado, and Tonto National Forests and the Saguaro National Monument, Arizona, and Carson, Lincoln, and Santa Fe National Forests and Taos Pueblo Indian Reservation and Navajo Indian Reservation, New Mexico. Losses resulting from Douglas-fir beetle attacks in 1991 approximated 168,250 cubic feet of volume Region-wide.
Mountain pine beetle *Dendroctonus ponderosae*	Ponderosa pine	Arizona, New Mexico	Acres of mountain pine beetle-caused ponderosa pine mortality increased from 800 in 1990 to 1,440 in 1991. Individual and scattered small group tree mortality (2 to 10 trees) were observed on the Santa Fe National Forest and the Navajo Indian Reservation, New Mexico. Volume losses resulting from these bark beetles were estimated at 143,250 cubic feet southwestwide.
Pandora moth *Coloradia pandora*	Ponderosa pine	Arizona, New Mexico	No pandora moth defoliation was detected in 1991.
Pine engraver beetles *Ips* spp.	Ponderosa pine	Arizona, New Mexico	Ponderosa pine mortality resulting from pine engraver beetle attacks decreased from 31,420 acres in 1990 to 11,030 acres in 1991. Individual, small-group tree mortality (2 to 10 trees), and occasional large-group tree mortality (25 trees and more) occurred on the Apache-Sitgreaves, Coconino, Kaibab, Prescott, and Tonto National Forests and Navajo, Hualapai, Fort Apache, and San Carlos Apache Indian Reservations, Arizona; and on the Cibola, Gila, Linjcoln, and Santa Fe National Forests and Mescalero and Navajo Indian Reservations, New Mexico.

Southwestern Region--Status of insects in Arizona and New Mexico.

Insect	Host	Location	Remarks
	Pinyon pine	Arizona	*Ips*-caused pinyon pine mortality decreased significantly, from 22,800 acres in 1990 to 620 acres of the pinyon-juniper forest cover type in 1991. Small-group tree mortality occurred on the Apache-Sitgreaves and Coconino National Forests and the Hualapai Indian Reservation, Arizona. Tree volume losses from these bark beetles were estimated at 539,280 cubic feet for ponderosa pine and 6,400 cubic feet for pinyon pine.
Prescott scale *Matsucoccus vexillorum*	Ponderosa pine	Arizona	Branch dieback, caused by Prescott scale, was scattered throughout the Region during 1991. Approximately 700 acres are still infested by this scale insect on the Fort Apache Indian Reservation in Arizona and areas of the Apache-Sitgreaves National Forest are affected as well.
Spruce beetle *Dendroctonus rufipennis*	Spruce	Arizona, New Mexico	Total acres of spruce beetle-caused tree mortality increased from 150 in 1990 to 430 in 1991. Individual tree mortality and scattered small-group tree mortality (two to five trees) were widely scattered throughout the spruce forest cover type. Mortality occurred on the Coconino, Coronado, and Kaibab National Forests and Navajo and Fort Apache Indian Reservations, Arizona. Scattered spruce beetle activity was detected on State and private lands near Tierra Amarilla and Sandoval County, New Mexico. Current year's volume losses from spruce beetle attacks approximated 42,750 cubic feet.

Southwestern Region--Status of insects in Arizona and New Mexico.

Insect	Host	Location	Remarks
Unknown spruce aphid	Spruce	Arizona	No significant activity was reported in 1991.
Western pine beetle *Dendroctonus brevicomis* **Roundheaded pine beetle** *Dendroctonus adjunctus*	Ponderosa pine	Arizona, New Mexico	Mortality from western pine beetle activity increased significantly from 9,015 acres in 1990 to 91,320 acres in 1991. The majority of the mortality detected this year occurred in combination with roundheaded pine beetle, and was located on the Mescalero Apache Indian Reservation (71,785) acres) and the Lincoln National Forest (10,135 acres), New Mexico. Less extensive acreages of western pine beetle-caused mortality also occurred on the Tonto, Coconino, Coronado, and Kaibab National Forests and the Navajo, Fort Apache, and San Carlos Indian Reservations, Arizona; and the Carson, Cibola, and Gila National Forests and the Picuris Indian Reservation, New Mexico. Tree volume losses on National Forest and other Federal lands were estimated at 8,917,550 cubic feet.
Western spruce budworm *Choristoneura occidentalis*	Douglas-fir, True firs, Spruce	Arizona, New Mexico	Defoliation caused by the larvae of the western spruce budworm decreased from 310,580 acres in 1990 to 218,613 acres in 1991. Defoliation occurred on the Carson (129,320 acres), Santa Fe (42,960 acres), Cibola (6,880 acres), Gila (2,640 acres), and Lincoln (300 acres) National Forests and the Santa Clara (3,640 acres) and Navajo (200 acres) Indian Reservations, New Mexico. Defoliation occurred on 32,670 acres of State and private land in Colfax, Mora, Rio Arriba, Sandoval, and Taos Counties in New Mexico. Scattered light defoliation was detected from the ground in the mixed conifer type on the Kaibab and Apache-Sitgreaves National Forests in Arizona.
White fir needleminer *Epinotia meritana*	White fir	Arizona	A total of 156 acres of white fir needleminer defoliation was detected on the Kaibab National Forest in Arizona.

Southwestern Region--Status of insects in Arizona and New Mexico.

Southwestern Region Diseases

Prepared by Mary L. Fairweather

Disease	Host	Location	Remarks
Stem and Branch Diseases			
Aspen stem cankers *Encoelia pruinosa* *Ceratocystis fimbriata* *Cryptosphaeria populina* *Hypoxylon mammatum* *Cytospora chrysosperma*	Aspen	Arizona, New Mexico	These canker fungi cause significant reductions in growth and vigor of mature aspen stands. In Region 3, stands often have over 30 percent infection with canker fungi. In campgrounds, stem cankers are typically more prevalent due to damage from campers.
Aspen trunk rot *Phellinus tremulae*	Aspen	Arizona, New Mexico	Aspen trunk rot is the most common cause of decay in mature aspen stands throughout the Region.
Atropellis canker *Atropellis sp.*	Southwestern white pine	New Mexico	Stem cankers were found on pole-size trees on the Lincoln National Forest and Mescalero-Apache Indian Reservation. Branch flagging is also common and could be mistaken for white pine blister rust.
Comandra blister rust *Cronartium comandrae*	Mondell pine, Ponderosa pine	Arizona	Comandra blister rust occurs on exotic mondell and native ponderosa pines in the Payson, Sedona, and Prescott areas. Damage is to individual trees in landscape areas and Christmas tree plantations.
Dwarf mistletoes *Arceuthobium* spp.	Douglas-fir, Spruces, Pines	Arizona, New Mexico	Dwarf mistletoes are the most widespread pest in the Region. Approximately 46 percent (2.2 million acres) of the total commercial acreage (4.8 million acres) is infected, accounting for greater than 25 million cubic feet of volume loss. Aesthetic value and longevity of trees in recreation areas and visual corridors are also impacted.
Fir broom rust *Melampsorella caryophyllacearum*	True firs	Arizona, New Mexico	Fir broom rust is widely distributed throughout the subalpine, corkbark, and white fir habitat types in the southwest. Damage typically consists of stem and branch swellings, dead tops, and stem breakage.

Southwestern Region--Status of diseases in Arizona and New Mexico.

Disease	Host	Location	Remarks
Limb rust *Cronartium arzonicum* *Peridermium filamentosum*	Ponderosa pine	Arizona	Small-group (two to three trees) infection are located throughout the ponderosa pine forests of the southwest.
Red ring rot *Phellinus pini*	Douglas-fir, Ponderosa pine, Spruce, True firs	Arizona, New Mexico	*Phellinus pini* is indigenous to mature and overmature stands of pine and mixed conifers. Its distribution is scattered and losses and damages are minimal in most stands.
Red rot *Dichomitus squalens*	Ponderosa pine	Arizona, New Mexico	Red rot decay is distributed throughout the Region, and is the most common cause of decay in living ponderosa pine in the southwest.
Rust-red stringy rot *Echinodontium tinctorium*	White fir	Arizona, New Mexico	This fungus is found in mature and over-mature stands of mixed conifers.
Spruce broom rust *Chrysomyxa arctostaphyli*	Spruce	Arizona, New Mexico	Spruce broom rust is scattered throughout the host type but is of little commercial significance.
White pine blister rust *Cronartium ribicola*	Southwestern white pine	New Mexico	Cankers have been observed throughout the host range on the Cloudcroft, Mayhill, and Smokey Bear Ranger Districts, and on the Mescalero-Apache Indian Reservation. Several hundred acres of young plantations on the Cloudcroft Ranger District are severely infected. Visible damage in infected areas is minimal, but will increase steadily in coming years.
Root Diseases			
Annosus root disease *Heterobasidion annosum*	Ponderosa pine, True firs, Spruces, Douglas-fir	Arizona, New Mexico	In Arizona and New Mexico, root and butt rot pathogens are responsible for reducing approximately 10 percent of the total volume of infected stands. Infection in some mixed conifer stands is greater than 25 percent. *Armillaria* sp. accounted for 80 percent of the root disease damage in conifers; other pathogens were responsible for the remaining 20 percent. The southwest loses an estimated 4.8 million cubic feet of timber annually to root rot.
Armillaria root disease *Armillaria* sp.	Aspen, Douglas-fir, Ponderosa pine, Spruce, True firs	Arizona, New Mexico	

Southwestern Region--Status of diseases in Arizona and New Mexico.

Disease	Host	Location	Remarks
Black stain root disease *Leptographium wageneri var. wageneri*	Pinyon pine	Arizona, New Mexico	No significant activity was reported in 1991.
Schweinitzii butt rot *Phaeolus schweinitzii*	Douglas-fir, True firs	Arizona, New Mexico	No significant activity was reported in 1991.
Tomentosus root rot *Inonotus tomentosus*	Spruce	Arizona, New Mexico	No significant activity was reported in 1991.
White mottled rot *Ganoderma applanatum*	Aspen	Arizona, New Mexico	No significant activity was reported in 1991.
Foliage Diseases			
Elytroderma needle disease *Elytroderma deformans*	Pinyon pine, Ponderosa pine	Arizona, New Mexico	Elytroderma disease is distributed widely but at low levels.
Lophodermella needle cast *Lophodermella cerina*	Ponderosa pine	Arizona, New Mexico	In 1991 this needle cast was only detected in New Mexico. Approximately 18,000 acres exhibited mostly low to moderate levels of discoloration.
Nursery Diseases			
Sirococcus tip blight *Sirococcus strobilinus*	Ponderosa pine	Arizona	No significant activity was reported in 1991.
Abiotic Damage			
Drought	Juniper, Pinyon, Ponderosa pine	Arizona, New Mexico	Drought related tree damage was significantly lower Region-wide than in 1990. However, drought-stressed trees were attacked by bark beetles over a large area on the Lincoln National Forest and Mescalero-Apache Indian Reservation in New Mexico.
Salt damage	Ponderosa pine	Arizona, New Mexico	Needle discoloration occurred along high elevations in New Mexico and Arizona from salt used to de-ice highways. Salt damage was also observed on dirt roads in Arizona where salts were used for dust abatement.

Southwestern Region--Status of diseases in Arizona and New Mexico.

Disease	Host	Location	Remarks
Winter Injury	Alligator juniper	Arizona	Needle discoloration and top dieback of small diameter alligator juniper was observed on the Heber, Lakeside, Springerville, and Alpine Ranger Districts of the Apache-Sitgreaves National Forest. The alligator juniper was at the extent of its range in these areas and had been affected by the cold winter temperatures the area received in December of 1990.
Other Damage			
Aspen defoliation **Large aspen tortrix** *Choristoneura conflictana* **Western tent caterpillar** *Malacosoma californicum* **Marssonina leaf blight** *Marssonina populi*	Aspen	Arizona, New Mexico	Defoliation of aspen stands by this insect and disease complex increased significantly Region-wide from 3,670 acres in 1990 to 29,140 acres in 1991. Small pockets of aspen defoliation occurred on the Apache-Sitgreaves and Coconino National Forests and the Fort Apache Indian Reservation, Arizona; and the Carson, Gila, Cibola, Lincoln, and Santa Fe National Forests and the Mescalero and Navajo Indian Reservations, New Mexico.
True fir mortality *Scolytus ventralis* (in white fir); *Dryocetes confusus* (in subalpine fir) *Armillaria spp.* *Heterobasidion annosum*	White fir, Subalpine fir	Arizona, New Mexico	True fir mortality resulting from this insect and disease complex increased from 1,390 acres in 1990 to 2,495 acres in 1991. Mortality consisted of individual and small-group (two to ten trees) killed on the Coconino and Coronado National Forests and Navajo Indian Reservation, Arizona, and the Cibola, Gila, Lincoln, and Santa Fe National Forests and the Mescalero and Navajo Indian Reservation, New Mexico. Volume losses attributed to this insect and disease complex were estimated at 177,600 cubic feet.
Looper, abiotic complex *Galenara consimilis*	Douglas-fir, White fir	New Mexico	No significant activity was reported in 1991.

Southwestern Region--Status of diseases in Arizona and New Mexico.

Intermountain Region Insects

Prepared by K. Andrew Knapp

Insect	Host	Location	Remarks
Boxelder leafroller *Caloptilla negundella*	Boxelder	Idaho	Scattered boxelder trees along the Salmon River in the vicinity of Salmon, Idaho, were infested with this leafroller.
Cooley spruce gall adelgid *Adelges cooleyi*	Spruce	Idaho, Utah, Wyoming	This adelgid was found on forest and ornamental trees throughout the region; impact appeared greatest in ornamental trees.
Douglas-fir beetle *Dendroctonus pseudotsugae*	Douglas-fir	Idaho, Utah, Wyoming	Mortality decreased considerably, with 89,800 trees killed by the beetle in 1991, compared to 178,400 trees killed in 1990. In southern Idaho, 80,400 trees were killed. Significant decreases in mortality occurred on the Boise, Caribou, Challis, and Salmon National Forests; moderate decreases in mortality occurred on the Payette and Sawtooth National Forests; and increasing mortality was observed on the Targhee National Forest. In Utah, 900 trees were killed, a significant reduction from previous levels. Static levels of mortality were observed in the Book Cliff area in central Utah, while significant reductions in tree mortality occurred on the Manti-LaSal and Wasatch-Cache National Forests. Moderate decreases in tree mortality, totaling 8,500 trees, occurred on the Bridger-Teton National Forest in western Wyoming.
Douglas-fir tussock moth *Orgyia pseudotsugata*	Douglas-fir, True firs	Idaho, Utah	Defoliation increased from 53,000 acres in 1990 to 316,900 acres in 1991, the largest amount of Douglas-fir tussock moth-caused defoliation ever recorded in the Region. In Idaho, 312,000 acres of defoliation were detected on the Boise National Forest and contiguous areas of the Sawtooth National Forest, on the Payette National Forest, and throughout the Owyhee Mountains. In northern Utah, 4,900 acres of defoliation were detected on the Wasatch-Cache National Forest. Most defoliation was classified as being of moderate to heavy intensity.

Intermountain Region--Status of insects in southern Idaho, Nevada, Utah, and western Wyoming.

Insect	Host	Location	Remarks
Fir engraver beetle *Scolytus ventralis*	Grand fir, Red fir, White fir	California, Idaho, Nevada, Utah	Mortality increased significantly with 249,400 trees killed in the region. In Nevada, 193,000 trees were killed on the Toiyabe National Forest, with virtually all susceptible host stands infested. In Utah, increasing mortality was observed, with 43,700 trees being killed on the Wasatch-Cache National Forest. In south Idaho, 12,700 trees were killed, with increasing mortality noted on the Payette National Forest and decreasing mortality noted on the Boise National Forest.
Gypsy moth *Lymantria dispar*	Hardwoods	Utah	This is the third consecutive year of the Utah Gypsy Moth Eradication Program. In 1991, three 29,900-acre aerial applications of Bacillus thuringiensis (B.t.) were applied in the Bountiful, Provo, and Salt Lake City, Utah area.
Jeffrey pine beetle *Dendroctonus jeffreyi*	Jeffrey pine	California, Nevada	Tree mortality attributed to Jeffrey pine beetle decreased to 2,900 trees on the Toiyabe National Forest in western Nevada.
Large aspen tortrix *Choristoneura conflictana*	Aspen	Utah	Defoliation was observed near Big Lake, Hancock Flat, and Daniels Canyon on the Fishlake National Forest in Utah.
Mountain pine beetle *Dendroctonus ponderosae*	Lodgepole pine, Ponderosa pine	Idaho, Utah, Wyoming	Increases in mortality occurred region-wide; however, mortality continues to remain at historically low levels. In 1990, approximately 11,900 trees were killed; while during 1991, 33,700 dying trees were observed. In southern Idaho, 30,400 fading trees were observed. The largest infestation was located on the Sawtooth National Recreation Area, where 12,000 trees were killed. Elsewhere, increases in mortality occurred on the Boise, Challis, Payette, and Targhee National Forests, while decreases in mortality occurred on the Salmon National Forest. In Utah, 1,600 trees were killed, with decreases in mortality occurring on the Dixie and Manti-LaSal National Forests. On the Bridger-Teton National Forest in western Wyoming, 1,700 trees were killed; an increase in mortality from 1990.
Oystershell scale *Lepidosaphes ulmi*	*Populus* spp.	Utah	Heavy populations infesting cottonwoods and aspen were located in Ranch Canyon on the Bureau of Land Management Beaver Resource Area near Milford, Utah. Damage was variable, ranging from branch mortality to tree mortality.

Intermountain Region--Status of insects in southern Idaho, Nevada, Utah, and western Wyoming.

Insect	Host	Location	Remarks
Pine engraver beetle *Ips pini*	Lodgepole pine, Ponderosa pine	Idaho, Nevada, Utah	This insect, often associated with western pine beetle and Jeffrey pine beetle, occurred throughout southern Idaho and western Nevada.
Pinyon pine engraver beetle *Ips confusus*	Pinyon pine	Utah	Scattered pockets of mortality caused by this insect were found on the Dixie and Fishlake National Forests, and in the Book Cliff area on lands administered by the Bureau of Land Management.
Silver fir beetle *Pseudohylesinus sericeus*	Grand fir	Idaho	Large populations of this beetle were found overwintering in root collars of grand firs from Smith's Ferry to McCall, Idaho. Infestation did not cause measurable damage.
Spruce beetle *Dendroctonus rufipennis*	Spruce	Idaho, Utah, Wyoming	Tree mortality caused by this beetle in southern Idaho decreased from 185,500 trees in 1990 to 23,800 trees in 1991. Most of this decline in mortality occurred on the Payette National Forest, the only Forest in southern Idaho with significant spruce beetle activity. In Utah, spruce beetle killed 16,900 trees. Mortality increased on the Manti-LaSal National Forest and a new infestation was detected on the Dixie National Forest. On the Bridger-Teton National Forest in western Wyoming, 800 trees were killed, an increase from 1990. Region-wide, 41,500 trees were killed during 1991.
Spruce seed moth *Laspeyresia youngana*	Spruce	Utah	Moderate populations were found infesting cones on the Fishlake National Forest in Utah.
Sugar pine tortrix *Choristoneura lambertiana*	Pines	Idaho	Light to moderate defoliation of lodgepole pine occurred in scattered 5- to 10-acre pockets on the Salmon National Forest, Idaho.
Western balsam bark beetle *Dryocoetes confusus*	Subalpine fir	Idaho, Utah, Wyoming	Mortality increased region-wide, with 244,400 dying subalpine fir observed. In southern Idaho, 118,100 trees were killed, and extensive areas of the Caribou, Sawtooth, and Targhee National Forests were infested. Smaller infestations were present on the Boise, Challis, and Salmon National Forests. In Utah, 41,800 trees were killed; mortality was located on the Manti-LaSal, Uinta, and Wasatch-Cache National Forests. On the Bridger-Teton National Forest in western Wyoming, 84,500 trees were killed.

ermountain Region--Status of insects in southern Idaho, Nevada, Utah, and western Wyoming.

Insect	Host	Location	Remarks
Western pine beetle *Dendroctonus brevicomis*	Ponderosa pine	Idaho	Beetle populations continued to collapse on the Boise and Payette National Forests, with only 8,200 trees killed during 1991, compared to 23,800 trees killed in 1990.
Western spruce budworm *Choristoneura occidentalis*	Douglas-fir, True firs	Idaho	Defoliation levels remained static, with trees on 49,300 acres being defoliatead in 1991, compared to defoliation on 42,900 acres in 1990. All visible defoliation occurred in southern Idaho. Most defoliation was located on the Salmon National Forest, while smaller infestations were located on the Challis and Targhee National Forests. Defoliation intensity was mostly light.

Intermountain Region--Status of insects in southern Idaho, Nevada, Utah, and western Wyoming.

Intermountain Region Diseases

Prepared by K. Andrew Knapp

Disease	Host	Location	Remarks
Stem and Branch Diseases			
Aspen trunk rot *Phellinus tremulae*	Aspen	Idaho, Nevada, Utah, Wyoming	Decay occurred in most aspen stands in the Region.
Canker of subalpine fir (unidentified)	Subalpine fir	Idaho	Branch flagging, top-killing, and mortality attributed to this canker occurred in localized areas throughout host type. Increasing levels of infection were observed, and significant mortality occurred in southern Idaho.
Comandra blister rust *Cronartium comandrae*	Lodgepole pine, Ponderosa pine	Idaho, Utah, Wyoming	Infection occurred infrequently throughout Idaho and Utah. Heavy, localized areas of infection resulting in branch, top, and entire tree mortality of sapling-size ponderosa pines occurred in southeastern Idaho. In Wyoming, infection frequently occurred in all size classes of lodgepole pine.
Cytospora canker of true firs *Cytospora abietis*	True firs	Idaho, Nevada, Utah	Branch flagging, top-killing, and mortality attributed to this canker occurred in the host type in localized areas. Increasing levels of infection were observed, and significant mortality occurred in southern Idaho, southern Utah, and western Nevada.
Dwarf mistletoes *Arceuthobium* spp.	Douglas-fir, Jeffrey pine, Lodgepole pine, Ponderosa pine, True firs, Western larch	Idaho, Nevada, Utah, Wyoming	Suppression projects continue to remove infected trees; however, these pests remain the most widespread and frequently observed pest within the Intermountain Region.

Intermountain Region--Status of diseases in southern Idaho, Nevada, Utah, and western Wyoming.

Disease	Host	Location	Remarks
Limb rust *Peridermium filamentosum*	Ponderosa pine	Utah	Infection causing branch mortality and occasional tree mortality occurred in all size classes of trees on the Dixie National Forest in southern Utah.
Pinyon blister rust *Cronartium occidentale*	Pinyon pine	Idaho, Utah	This disease was observed on the Moab Ranger District, Manti-LaSal National Forest, Utah, and in the Raft River Mountains of the Sawtooth National Forest, Idaho.
Red ring rot *Phellinus pini*	Douglas-fir, Pines, Spruce, True firs, Western larch	Idaho, Utah, Wyoming	Infection intensity varies throughout stands in the Region.
Rust-red stringy rot *Echinodontium tinctorium*	Grand fir, Subalpine fir, White fir	Idaho, Nevada, Utah	Decay caused by this fungus was common in mature and overmature stands of true firs.
Stalactiform blister rust *Cronartium coleosporioides*	Lodgepole pine	Idaho, Nevada, Utah	This rust occurred in localized areas throughout the host type. Heavy infection has been noted in localized areas on the Salmon, Sawtooth, and Targhee National Forests in Idaho.
True mistletoe on juniper *Phoradendron juniperinum*	Junipers	Nevada, Utah	This pest occurred on juniper on the Fishlake and Dixie National Forests in Utah and in the Great Basin National Park in Nevada.
Western gall rust *Endocronartium harknessii*	Lodgepole pine, Ponderosa pine	Idaho, Utah, Wyoming	Gall rust occurred coextensively with the two host types. Varied infection levels are observed with localized heavy infection levels in both host species.

Intermountain Region--Status of diseases in southern Idaho, Nevada, Utah, and western Wyoming.

Disease	Host	Location	Remarks
White pine blister rust *Cronartium ribicola*	Limber pine, Western white pine, Whitebark pine	California, Idaho, Nevada, Wyoming	This disease was commonly found on both five-needle pine hosts on the Payette, Salmon, and Sawtooth National Forests. This pest was observed on western white pine on the Toiyabe National Forest in Nevada and California.
Other stem decays	All tree species	Idaho, Nevada, Utah, Wyoming	A large number of minor stem decay agents occur with varying intensity throughout the Region.
Root Diseases			
Annosus root disease *Heterobasidion annosum*	Douglas-fir, Engelmann spruce, Jeffrey pine, Lodgepole pine, Ponderosa pine, True firs	California, Idaho, Nevada, Utah, Wyoming	Infection caused varying amounts of root and butt rot in mature individuals of many tree species, and resulted in predisposition to beetle attack. This pest occurred most commonly in true fir stands in southern Idaho and Utah. Infection-induced mortality occurred frequently in young ponderosa pine and infrequently in Douglas-fir and subalpine fir.
Armillaria root disease *Armillaria* sp.	Douglas-fir, Grand fir, Pines, Spruce, Subalpine fir	Idaho, Nevada, Utah, Wyoming	Evidence of *Armillaria* was found throughout the Region. In southern Idaho, northern Utah, Nevada, and Wyoming, it functioned primarily as a weak pathogen or saprophyte causing little direct mortality. In southern Utah, it acted as a primary pathogen killing mature and immature ponderosa pine and mature fir and spruce.
Artist's conk *Ganoderma applanatum*	Aspen	Idaho, Nevada, Utah, Wyoming	This pathogen was commonly observed in association with wind-thrown aspen on the Dixie and Fishlake National Forests in Utah.

Intermountain Region--Status of diseases in southern Idaho, Nevada, Utah, and western Wyoming.

Disease	Host	Location	Remarks
Black stain root disease *Ophiostoma wageneri* (=*Ceratocystis wageneri*)	Pinyon pine	Idaho, Nevada, Utah	This fungus caused mortality of pinyon pine on the Bureau of Land Management's Burley District in Idaho, on the Humboldt and Toiyabe National Forests in Nevada, and on the Dixie and Manti-LaSal National Forests in Utah.
Schweinitzii butt rot *Phaeolus schweinitzii*	Douglas-fir, Ponderosa pine	Idaho	Decay was common in mature and overmature forests of the host type, especially those having a fire or logging history. The fungus was often associated with other root pathogens and bark beetle activity.
Tomentosus root disease *Inonotus tomentosus*	Douglas-fir, Spruce, Subalpine fir	Idaho, Utah	The fungus is found alone or associated with *P. schweinitzii*, causing root and butt rot of pole-size and larger trees in southern Idaho. In southern Utah, it killed pole-sized and larger spruce in progressively enlarging disease centers.
Foliage Diseases			
Conifer - Aspen rust **Conifer - Cottonwood rust** *Melampsora medusae* *Melampsora occidentalis*	Aspen, Conifers, Cottonwood	Idaho	Infected cottonwood and aspen were commonly observed in southern Idaho. Some aspen clones were severely defoliated by these fungi. Limited infection of the alternate host conifers was observed.
Douglas-fir needle cast *Rhabdocline* spp.	Douglas-fir	Idaho	Incidence decreased with light infection noted throughout the range of Douglas-fir in southern and eastern Idaho.
Elytroderma needle disease *Elytroderma deformans*	Ponderosa pine	Idaho	Systemic infections occurred throughout the host type but were especially severe in southwestern Idaho. Except in the systemic "brooms," new foliage discoloration caused by this fungus decreased in 1991.
Fir broom rust *Melampsorella caryophyllacearum*	Subalpine fir	Idaho, Nevada, Utah, Wyoming	Infection occurred throughout the host's range. Infection intensity varies significantly.

Disease	Host	Location	Remarks
Fir needle cast *Lirula* spp.	Grand fir, Subalpine fir	Idaho	Infection occurred at endemic levels throughout forests of the host type.
Fir needle rust *Pucciniastrum* sp.	Subalpine fir	Idaho	Seedling and sapling-size trees throughout forests of the host type were variably infected. At higher elevations around McCall, Idaho, hosts were heavily infected. Elsewhere, infection was light.
Incense cedar broom rust *Gymnosporangium libocedri*	Incense cedar	California, Nevada	This disease occurred in isolated patches of host trees on the Toiyabe National Forest, Nevada and California.
Larch needle cast *Meria laricis*	Western larch	Idaho	Incidence and severity of infection in west central Idaho were very light. Detection was confounded by severe frost-caused foliage discoloration that occurred shortly after spring needle flush.
Marssonina blight *Marssonina populi*	Aspen	Idaho, Utah, Wyoming	Scattered incidence of moderate to heavy intensity was noted throughout most of the host's range in southern Idaho, northern Utah, and western Wyoming.
Shepherd's crook *Venturia macularis*	Aspen	Idaho	Scattered but increasing incidence of light to moderate intensity was noted in southern Idaho.
Spruce broom rust *Chrysomyxa* spp.	Engelmann spruce	Idaho, Utah, Wyoming	Scattered infections occurred throughout the host type, especially in eastern Idaho and in localized pockets on the Fishlake National Forest, Utah.
Nursery Diseases			
Fusarium cortical stem rot *Fusarium avenaceum*	*Abies* spp., Douglas-fir, Ponderosa pine	Idaho	This fungus caused scattered mortality, primarily of 1-0 conifer seedlings at the Lucky Peak Nursery, Boise National Forest, Idaho.

Intermountain Region--Status of diseases in southern Idaho, Nevada, Utah, and western Wyoming.

Disease	Host	Location	Remarks
Fusarium root disease *Fusarium oxysporum*	*Abies* spp., Douglas-fir, Ponderosa pine	Idaho	This fungus caused small amounts of mortality primarily of 1-0 conifer seedlings at the Lucky Peak Nursery, Boise National Forest, Idaho.
Phytophthora/ Pythium root rot *Phytophthora* spp. *Pythium* spp.	Douglas-fir	Idaho	These fungi occurred on seedlings and in soil at the Lucky Peak Nursery, Boise National Forest, Idaho. Infection results in mortality and culling of 2-0 seedlings.
Abiotic Damage			
Drought effects	All vegetation	Regionwide	Premature needle drop, leaf scorch, and seedling mortality were observed due to 5 consecutive years of below-normal precipitation.
Spring frost	Western larch	Idaho	An early spring frost killed foliage on the Payette National Forest, Idaho.
Winter drying	Ponderosa pine	Utah	Locally heavy patches of foliage discoloration and mortality occurred on the Flaming Gorge Ranger District, Ashley National Forest, and on the Cedar City Ranger District, Dixie National Forest.

Pacific Southwest Region Insects

Prepared by John W. Dale

Insect	Host	Location	Remarks
A bark borer *Unknown*	*Tristiropsis acutangular*	Guam	No significant activity was reported in 1991.
A California spruce budworm *Choristoneura carnana californica*	Douglas-fir	Northern California	This defoliator has remained at endemic levels since the end of the Trinity County outbreak in 1985.
A Caroline short-nosed weevil *Lophothetes* sp.	Avocado, Banana, Citrus, Tropical almond, and others	Republic of Palau	No significant activity was reported in 1991.
A coneworm *Dioryctria* sp.	Red fir	California	Larvae occurred in cones shipped to the Placerville Nursery.
A cutworm *Euxoa (perexcellens?)*	Jeffrey pine, Red fir, White fir	Central California	No significant activity was reported in 1991.
A cutworm *Spondoptera litara*	Cruciferous crops	Federated States of Micronesia	This is a frequent pest in agro-forestry gardens.
A Gelechiid leaf skeletonizer *Chionodes trichostola*	Blue oak	Northern California	Populations appeared to collapse after the first larval instar. No significant defoliation occurred in northern California.
A leafhopper *Sophonia (=Pseudonirvana)* sp. nr. *rufofascia*	Numerous hosts	Kauai, Oahu, Lanai, and Hawaii Islands	Leaves become chlorotic and/or distorted.
A leafhopper *Unknown*	*Aracaria aurea* and *A. mangium*	Guam, Northern Mariana Islands	Identification has not yet been made by a specialist.
A leafroller *Unknown*	Eucalyptus	Guam, Northern Mariana Islands	Identification has not yet been made by a specialist.

Pacific Southwest Region--Status of insects in California, Hawaii, American Samoa, the Commonwealth of the Northern Mariana Islands, the Territory of Guam, the Federated States of Micronesia, and the Trust Territory of Palau.

Insect	Host	Location	Remarks
A long-horned grasshopper *Oxyahyla intricata*	Cassava, Vegetable crops	Federated States of Micronesia	No significant activity was reported in 1991.
A long-horned grasshopper *Segestes unicolor*	Coconut and other palms, *Heterospathe elata*	Koror - Republic of Palau	Populations were serious on coconut and other palms.
A Mirid bug *Helopeltis* sp.	*Aracaria mangium*	Guam	Newly detected, identity is not confirmed.
A pine needle weevil *Scythropus* sp.	Jeffrey pine, Ponderosa pine	California	No significant activity was reported in 1991.
A pyralid moth *Thliptoceras octoquttale*	*Mussaenda frondosa*	Palau - Republic of Palau	This moth bores into apical buds and is a serious pest of this shrub.
A rose beetle *Adoretus versutus*	Cocoa, Grapes, Loquat, Ramutan	American Samoa	No significant activity was reported in 1991.
A scarab beetle *Dichelonyx* (*backi*?)	Ponderosa pine	Northern California	No significant activity was reported in 1991.
A scarab beetle *Serica anthracina*	Douglas-fir, Ponderosa pine	Northern California	This beetle caused light to severe damage to Douglas-fir seedlings at the Foresthill Breeding Orchard, Tahoe National Forest.
A short-horned grasshopper *Conocephaleus longipennis*	Vegetable crops	Federated States of Micronesia	This pest damaged crops in agro-forestry. Birds and ground lizards provide good biological control.
A short-horned grasshopper *Valanga nigricornis*	Banana, Citrus, Coconut palm	Palau - Republic of Palau	Damage was common on host plants.
A short-nosed weevil *Lophothetes* sp.	Banana, Mango, many ornamental plants	Palau - Republic of Palau	This weevil continues to be a serious problem on host plants.
A stick insect *Graeffea crovanii*	Coconut palm	American Samoa	No significant activity was reported in 1991.

Insect	Host	Locations	Remarks
A sulfur butterfly *Eurema hecabe*	*Albizia* sp.	Northern Mariana Islands	No significant activity was reported in 1991.
A thrips *Pseudoanaphothrips* sp.	Norfolk Island pine	Hawaii Island, Oahu Island	No significant activity was reported in 1991.
A thrips *Rhiyiphorothrips pulchellus*	Mountain apple	Oahu Island	No significant activity was reported in 1991.
A thrips *Scirtothrips dorsalis*	*Aracaria aurea*	Guam	Newly detected, identity is not yet confirmed.
A thrips *Unknown*	Mango, *Phaleria nisidai*	Republic of Palau	No significant activity was reported in 1991.
A tip borer *Unknown*	Mahogany	Federated States of Micronesia	No significant activity was reported in 1991.
A wax scale *Ceroplastes* sp.	*Antidesma bunius*, *Ficus microcarpa*, *Gmelina palawensis*, *Mussaenda* spp., *Spondias pinnata*	Koror - Republic of Palau	Tree branches were heavily covered with the scale, and scale caused the death of small branches.
An hesperiid moth *Hasora choromus*	*Pongamia pinnata*	Republic of Palau	No significant activity was reported in 1991.
Agamemnon butterfly *Papilio agamemnon*	*Annona muricata*	Palau - Republic of Palau	Defoliation of new leaves.
Amethyst cedar borer *Semanotus amethystinus*	Incense-cedar, Port-Orford-cedar	Northern California	Drought, altered water tables, and mechanical damage predisposed trees to attack.
Ash whitefly *Siphoninus phillyreae*	Ornamental trees and shrubs	California	Also known as the pomegranate, pear, or peach whitefly, this exotic has now spread to 46 of California's 58 counties since it was first found in July 1988.
Balsam twig aphid *Mindarus abietinus*	White fir	Northern California	Research continued on the population at Placerville Nursery. It now appears that this aphid may be a new species of Mindarus.

: **Southwest Region**--Status of insects in California, Hawaii, American Samoa, the Commonwealth of the Northern Mariana Islands, the erritory of Guam, the Federated States of Micronesia, and the Trust Territory of Palau.

Insect	Host	Location	Remarks
Banana aphid *Pentalonia nigronervosa*	Banana	Federated States of Micronesia	No significant activity was reported in 1991.
Banana root borer *Cosmopolites sordidus*	Banana, Cocoa	Guam, Northern Mariana Islands	The nature of the damage makes this borer difficult to control.
Black citrus swallowtail butterfly *Papilio polytes*	Citrus	Guam, Northern Mariana Islands, Palau - Republic of Palau	Larvae caused extensive defoliation of young citrus trees in the Marianas; complete defoliation occurred on seedlings in Palau.
Black cutworm *Agrotis ipsilon*	Douglas-fir, Jeffrey pine	Northern California	Damage at Humboldt Nursery was minor.
Black garden fleahopper *Helticus tibialis*	Cassava, Vegetable crops	Federated States of Micronesia	This insect was found on crops grown in agro-forestry.
Black pineleaf scale *Nuculaspis californica*	Ponderosa pine, Sugar pine	Northern California	High population levels caused visible defoliation of these pines at several widely scattered locations.
Black vine weevil *Otiorhynchus sulcatus*	Douglas-fir, Red fir	Northern California	Damage continued at Humboldt Nursery, but remained spotty over beds of 2-0 seedlings.
Blue gum psyllid *Ctenarytaina eucalypti*	Eucalyptus	Coastal California south of San Francisco Bay Area	This exotic psyllid attacks a number of Eucalyptus species grown in California and has potential impact in the floral, nursery, landscape, wood, and fuel industries, and in naturalized stands.
California flatheaded borer *Melanophila californica*	Ponderosa pine	Northern California	This borer, along with red turpentine beetle, attacked single and small groups of pines on most of McCloud Flats, Siskiyou County.
California oakmoth *Phryganidia californica*	Coast live oak	Northern California	Defoliation occurred at a few locations in Santa Cruz County.
Caroline fruitfly *Dacus frauenfeldi*	Guava, Mango, Mountain apple, Wax apple	Palau - Republic of Palau	This destructive fruitfly was reared from the fruit of host plants.

Insect	Host	Location	Remarks
Cedar bark beetles *Phleosinus* sp.	Incense-cedar, Port-Orford-cedar	California	Cedar bark beetles were often associated with mortality, but are considered to be secondary. The current drought has weakened hosts to the point where attacks can be successful.
Chinese rose beetle *Adoretus sinicus*	Acerola, Avocado, Banana, Cacao, Chico, Citrus, Grapes, Guava, Loquat, Polynesian chestnus, Rambutan, Rollinia, Sapote, Soursop, Tropical almond	America Samoa, Palau - Republic of Palau	American Samoa Community College, together with the University of Hawaii-Hilo, is currently studying integrated pest management methods for control of this beetle on American Samoa. Damage was commonly serious on leaves of the host plants found on Palau.
Citrus flower moth *Prays citri*	Citrus	Palau - Republic of Palau	Damage was observed on fruit rinds.
Citrus leafminer *Phyllocnistic citrella*	Citrus	American Samoa, Guam, Koror - Republic of Palau, Northern Mariana Islands	This insect was a serious pest on young citrus trees in American Samoa, and it was common on citrus leaves on Koror, Republic of Palau.
Citrus mealybug *Planococcus citri*	Banana, Citrus, Pandanus, Soursop	Federated State of Micronesia	Leaves, stems, and fruits are attacked.
Clover root curculio *Sitona hispidulus*	Cover crops	Northern California	No significant activity was reported in 1991.
Coconut beetle *Brontispa* sp.	Coconut palm	Guam	No significant activity was reported in 1991.
Coconut hispid beetle *Brontispa longissima*	Coconut palm	American Samoa	No significant activity was reported in 1991.

Pacific Southwest Region--Status of insects in California, Hawaii, American Samoa, the Commonwealth of the Northern Mariana Islands, the Territory of Guam, the Federated States of Micronesia, and the Trust Territory of Palau.

Insect	Host	Location	Remarks
Coconut leaf beetle *Brontispa chalybeipennis*	Coconut palm	Hawaii	No significant activity was reported in 1991.
Coconut red scale *Furcaspis oceanica*	Coconut palm	Palau - Republic of Palau	Heavy infestation resulted in yellowing and dropping of leaves.
Coconut rhinoceros beetle *Oryctes rhinoceros*	Coconut palm	Palau - Republic of Palau	*Baculovirus oryctes* and a parasitic wasp provide economic control on Palau, and monitoring of *B. oryctes* is ongoing on American Samoa.
Coconut scale *Aspidiotus destructor*	Avocado, Coconut, Guava, *Fagraea galilai*, and other plants	Palau - Public of Palau	Leaves of heavily infested plants yellow and fall.
Coconut shot-hole borer Unknown	Betelnut, Breadfruit	Federated States of Micronesia	Adults caused damage to young shoots.
Coconut trunk weevil *Rhabdoscelus asperipennis*	Coconut	Peleliu - Republic of Palau	This beetle damaged the base of trees by boring into the trunk.
Coneworms *Dioryctria baumhoferi* *Diorcytria cambiicola*	Ponderosa pine	Northern California	These coneworms continued to cause damage at the Chico Tree Improvement Center.
Conifer aphids *Cinara* spp.	White fir, Ponderosa pine	Northern and central California	Aphids continued to be abundant.
Cowpea aphid *Aphis caraccivora*	Breadfruit, Citrus, Mango	Federated States of Micronesia	No significant activity was reported in 1991.
Crab spider *Gasteracantha* sp.	Pollinators and other insects	Hawaii	No significant activity was reported in 1991.

Pacific Southwest Region--Status of insects in California, Hawaii, American Samoa, the Commonwealth of the Northern Mariana Islands, the Territory of Guam, the Federated States of Micronesia, and the Trust Territory of Palau.

Insect	Host	Location	Remarks
Douglas-fir beetle *Dendroctonus pseudotsugae*	Douglas-fir	Northern California	Tree mortality decreased from recent levels along the coast. A low-level population apparently exists on trees with severe dwarf mistletoe infections in the canyon of the South Fork of the Sacramento River, Siskiyou County.
Douglas-fir engraver *Scolytus unispinosus*	Douglas-fir	Northern California	No significant activity was reported in 1991.
Douglas-fir tussock moth *Orgyia pseudotsugata*	White fir	Northern California	Populations throughout California remain at low levels, with the exception of those on the Big Valley Ranger District, Modoc National Forest, where there is a two-year trend of increasing trap catches.
Douglas-fir twig weevil *Cylindrocopturus furnissi*	Douglas-fir	Northern California	No significant damage was reported in 1991.
Durbid plant hopper *Lamenia caliginea*	Banana, Mango, Sugar cane	Federated States of Micronesia	No significant damage was reported in 1991.
Egyptian fluted scale *Icerya aegyptiaca*	Beefwood, Citrus, and others	Republic of Palau	No significant activity was reported in 1991.
Eucalyptus borer *Phoracantha semipunctata*	Eucalyptus	San Francisco Bay Area, and Southern California	The acreage supporting infested trees increased on the Stanford University campus in Palo Alto, San Mateo County.
Eugenia psyllid *Trioza eugeniae*	Eugenia spp., Mountain apple	California, Federated States of Micronesia	This insect causes galls on leaves; infestations can become very abundant. It was found in California in May 1988.
Fall webworm *Hyphantria cunea*	Pacific madrone	Northern California	Defoliation escalated in the coastal counties of Humboldt, Mendocino, Santa Cruz, and Sonoma, and became abundant in the inland counties of Amador, El Dorado, Nevada, and Yuba.

Pacific Southwest Region--Status of insects in California, Hawaii, American Samoa, the Commonwealth of the Northern Mariana Islands, the Territory of Guam, the Federated States of Micronesia, and the Trust Territory of Palau.

Insect	Host	Location	Remarks
Fir coneworm *Dioryctria abietivorella*	Douglas-fir	Northern California	This coneworm continued to cause extensive damage to the small cone crop at the Chico Tree Improvement Center.
Fir engraver beetle *Scolytus ventralis*	White fir, Red fir	California	Mortality on mesic sites west of Highway I-5 was less apparent than in 1990. Mortality remained high in white fir stands growing on eastside pine sites in the southern Cascade Mountains and in the northern Sierra Nevadas south to Lake Tahoe. True fir mortality appeared to decline from 1989-1990 levels in the Lake Tahoe area and on the east side of the Sierra Nevadas, but is still well above expected norms. Mortality of white fir was low but is increasing in the southern Sierra Nevadas. The fir engraver was involved in the fir mortality that occurred on Mt. Palomar in San Diego County.
Fir flatheaded borer *Melanophila drummondi*	Douglas-fir	Northern California	The number of trees that died during 1991 was similar to 1990, with the exception of the area where Humboldt, Mendocino, and Trinity Counties meet. Here, the borer combined with drought and armillaria and blackstain root diseases to produce increasing levels of mortality.
Fruit-piercing moth *Othreis fullonia*	Banana, Carambola, Citrus, Coral tree, Eggplant, Guava, Mango, Papaya, Tomato	American Samoa, Guam, Northern Mariana Islands	Study of biological control by existing parasites continues on American Samoa. The Marianas report damage by adults that feed at night.
Fruittree leafroller *Archips argyrospila*	California black oak, other hardwoods	Southern California	No significant activity was reported. This defoliator has not been a problem since 1986.
Grasshoppers **Acrididae**	Douglas-fir	Northern California	High populations of grasshoppers were detected in recently planted progeny test plantations located near Big Lake, Trinity County, and Campbell Ridge in Humboldt County. Damage was prevented by use of non-woven polyester mats to control competing vegetation, cutting back vegetation for 15 to 20 feet around each mat, and spreading Nolo-Bait in the dried vegetation.

Insect	Host	Location	Remarks
Greenhouse thrips *Heliothrips haemorrhoidalis*	Monterey pine	Hawaii	No significant activity was reported in 1991.
Gouty pitch midge *Cecidomyia piniinopis*	Ponderosa pine	Northern California	Severe flagging occurred in several hundred acres of 10-year-old plantations on the western slope of Mt. Shasta, Siskiyou County. Low larval survival indicates only light damage for 1992. Damaged plantations also were reported from Nevada and Tuolumne Counties.
Green scale *Coccus viridus*	Banana, Citrus, Mango, Plumeria, Soursop	Federated States of Micronesia	No significant activity was reported in 1991.
Gypsy moth *Lymantria dispar*	Hardwoods, ornamentals	California	Approximately 21,000 traps captured 7 moths in 5 counties. Control projects were unnecessary.
Hemispherical scale *Saissetia coffeae*	Citrus	American Samoa	This was an occasional pest.
Hibiscus mealybug *Nipaecoccus vastator*	Coconut, Hibiscus, *Leucaena* spp., *Serianthes nelsonii*	Guam, Northern Mariana Islands	Ants appear to be attracted to this pest, probably for the honeydew.
Hibiscus psyllid *Mesohomotoma hibisci*	*Hibiscus tiliaceus*	Republic of Palau	No significant activity was reported in 1991.
Hollyhock thrips *Liothrips varicornis*	*Abutilon menziesii*, *Hibiscus* sp., *Kokia dryanarioides*, *Hibiscadelphus* sp.	Hawaii	No significant activity was reported in 1991.
Hulodes cranea	*Serianthes kanehirae*	Republic of Palau	No significant activity was reported in 1991.
Inornate scale *Aonidiella inorata*	Banana, Breadfruit, Citrus, Coconut	Federated States of Micronesia	This is one of the major pests of the island fruit crop.

Pacific Southwest Region--Status of insects in California, Hawaii, American Samoa, the Commonwealth of the Northern Mariana Islands, the Territory of Guam, the Federated States of Micronesia, and the Trust Territory of Palau.

Insect	Host	Location	Remarks
Jeffrey pine beetle *Dendroctonus jeffreyi*	Jeffrey pine	California	Jeffrey pine mortality was common in some locations within Lassen National Park and nearby Thousand Lakes Wilderness, Lassen National Forest, and near Williams Reservoir, Lassen County. Scattered Jeffrey pine mortality occurred in the San Bernardino Mountains in southern California.
Jeffrey pine needleminer *Coleotechnites* sp.	Jeffrey pine	California	No significant activity was reported in 1991.
Latania scale *Hemiberlesia lataniae*	Banana, Breadfruit, Citrus, Mango, Pandanus	Federated States of Micronesia	No significant activity was reported in 1991.
Leucaena psyllid *Heteropsylla cubana*	*Leucaena* spp., *Samanea saman*, Tangan-tangan	Guam, Northern Mariana Islands	Severe defoliation occurred on Tangan-tangan.
Lodgepole needleminer *Coleotechnites milleri*	Lodgepole pine	Yosemite National Park	Needleminer population densities remained low over most of the former outbreak areas in the Tuolumne-Merced watershed, Yosemite National Park. However, populations were high and rising in one area.
Mango shoot caterpillar *Bombotelia jocosatrix*	Cashew, Mango	Guam, Northern Mariana Islands	New leaves were damaged.
Mariana coconut leaf beetle *Brontispa mariana*	Coconut	Federated States of Micronesia	No significant activity was reported in 1991.
Melon aphid/ cotton aphid *Aphis gossypii*	Banana, Breadfruit, Cocoa, Mango, Mountain apple, Papaya, Plumeria	Federated States of Micronesia	This is a pest of many agro-forestry crops.

Pacific Southwest Region--Status of insects in California, Hawaii, American Samoa, the Commonwealth of the Northern Mariana Islands, the Territory of Guam, the Federated States of Micronesia, and the Trust Territory of Palau.

Insect	Host	Location	Remarks
Melon fly *Dacus cucurbirtae*	Avocado, Citrus, Figs, Mango	Northern Mariana Islands	No significant activity was reported in 1991.
Modoc budworm *Choristoneura retiniana*	White fir	Northern California	No significant activity was reported in 1991.
Mountain apple psyllid *Trioza vitiensis*	*Eugenia malaccensis*	Republic of Palau	No significant activity was reported in 1991.
Mountain pine beetle *Dendroctonus ponderosae*	Lodgepole pine, Ponderosa pine, Sugar pine	California	Total tree mortality attributable to attacks by the mountain pine beetle was about 75 percent of 1990 levels in 1991. The number of sugar pine killed appeared to be lower, while the number of western white pines attacked was more common. Infested ponderosa pine were not abundant, but were more common in the Coast Range and southern Cascades than in recent years. Sugar pine mortality was reported from throughout the west side of the Sierra Nevada Mountains, particularly the southern Sierra Nevadas.
Myrobalana butterfly *Badamia exclamationis*	*Terminalia catappa*, *Pongamia pinnata*	Koror - Republic of Palau	Defoliation was observed.
Nantucket pine tip moth *Rhyacionia frustrana*	Monterey pine	Central and southern California	No significant activity was reported in 1991.
New Guinea sugarcane weevil *Rhabdoscelus obscurus*	Betelnut, Coconut, Sugarcane (purple var.)	Palau - Republic of Palau	This weevil bores in trunks of palms and in canes of sugarcane.
Oak pit scale *Asterolecanium minus*	Coast live oak	Northern California	No significant activity was reported in 1991.
Orange spiny whitefly *Aleurocanthus spiniferus*	Breadfruit, Citrus	Federated States of Micronesia	This whitefly has been a major pest in the State of Kosrae, Federated States of Micronesia.

Pacific Southwest Region--Status of insects in California, Hawaii, American Samoa, the Commonwealth of the Northern Mariana Islands, the Territory of Guam, the Federated States of Micronesia, and the Trust Territory of Palau.

Insect	Host	Location	Remarks
Pacific tent caterpillar *Malacosoma constrictum*	*Quercus* spp., particularly blue oak	Northern California	No significant activity was reported in 1991.
Palau coconut beetle *Brontispa palauensis*	Coconut palm	Palau - Republic of Palau	This beetle caused some damage to newly opened leaves.
Palm Scale *Hemiberlesia palmae*	Betelnut, Breadfruit, Citrus	Federated States of Micronesia	No significant activity was reported in 1991.
Pandanus beetle *Oxycephala pandani*	*Pandanus* spp.	Republic of Palau	No significant activity was reported in 1991.
Pine engraver beetle *Ips* spp.	Pines	California	Pine engraver activity decreased in many areas throughout the North Coast Region. Mortality and top-killing by pine engravers generally were not as common as in 1990 in northern California. However, activity continued throughout many of the pine and mixed conifer stands on the west side of the Sierra Nevada Mountains. *Ips confusus* was found attacking singleleaf pinyon in southern California, and engraver beetles were associated with western pine beetle in mortality of Coulter pines.
Pine reproduction weevil *Cylindrocopturus eatoni*	Ponderosa pine	California	Only one report from Nevada County was submitted by field foresters.
Pink sugarcane mealybug *Saccharicoccus sacchari*	Sugarcane	Federated States of Micronesia	No significant activity was reported in 1991.
Poinciana looper *Pericyma cruegeri*	Flame tree, Yellow poinciana	Guam, Northern Mariana Islands, Palau - Republic of Palau	It is destructive during rainy season on Guam. A small number of flame trees were defoliated on Palau.
Protens scale *Parlatoria protens*	Betelnut, Citrus, Coconut, Mango, Pandanus	Federated States of Micronesia	No significant activity was reported in 1991.

Pacific Southwest Region--Status of insects in California, Hawaii, American Samoa, the Commonwealth of the Northern Mariana Islands, the Territory of Guam, the Federated States of Micronesia, and the Trust Territory of Palau.

Insect	Host	Location	Remarks
Redbanded thrips *Selenothrips rubrocinctus*	Avocado, Mango	Guam, Northern Mariana Islands, Palau - Republic of Palau	Mango trees were the most severely affected in the Marianas. Leaves of seedlings were scarified in Palau.
Red turpentine beetle *Dendroctonus valens*	Pines	California	Attacks and mortality occurred on diseased and stressed Monterey pines throughout the North Coast Region. Red turpentine beetle was involved in most of the pine mortality examined in northern California. Attacks by this beetle continued to be common on all pine species throughout the west side of the Sierra Nevadas, with sugar pine the most commonly impacted. Drought stress was indicated as a precursor.
Roundheaded fir borer *Tetropium abietis*	Red fir, White fir	California	Numerous red firs were killed during 1991 at higher elevations in Lassen National Park and in the Thousand Lakes Wilderness, Lassen National Forest. Drought stress, old age, and numerous dwarf mistletoe infections were involved, along with top-killing by the fir engraver.
Sequoia pitch moth *Vespamina sequoiae*	Monterey and other pines	Northern California	This insect continued to be a pest of ornamental Monterey pine throughout the North Coast Region. Numerous attacks occurred on lodgepole pines in Gerle Creek Campground, Eldorado National Forest.
Silverspotted tiger moth *Halisodota argentata*	White fir	Northern California	No significant activity was reported in 1991.
Spaeth pandanus beetle *Oxycephala spaethi*	*Pandanus* spp.	Republic of Palau	No significant activity was reported in 1991.
Spider mites *Tetranychus* spp.	Cassava, Papaya	Koror - Republic of Palau	Serious yellowing and defoliation occurred during the dry seasons.

Insect	Host	Location	Remarks
Spiraling whitefly *Aleurodicus dispersus*	Banana, Cassava, Coconut, Guava, Papaya, Plumeria, Poinsettia	American Samoa, Guam, Northern Mariana Islands, Palua - Republic of Palua	Damage can be serious on American Samoa. Parasites and predators appear to keep this whitefly in check on Palau. Similarly, a ladybird beetle and an encarsia wasp are used in the Marianas.
Spruce aphid *Elatobium abietinum*	Sitka spruce	Northwestern California (coastal)	Visible defoloiation extended from Arcata to Crescent City. Some observers considered damage to be greater than that of 1990.
Steatococcus scale *Steatococcus samaraius*	Beefwood, Citrus, *Erythrina* sp.	Republic of Palau	No significant activity was reported in 1991.
Stellate scale *Vinsonia stellifera*	Breadfruit, *Citrus* spp., Mango, Mountain apple, Soursop	Federated States of Micronesia	No significant activity was reported in 1991.
Strawberry root weevil *Otiorhynchus ovatus*	Douglas-fir, Red fir	Northern California	Damage at Humboldt Nursery appeared to decline.
Striped (white-tailed) mealybug *Ferrisia virgata*	Citrus	American Samoa	Although previously reported, it has been determined that this insect is not present in American Samoa. It will be dropped from future reports.
Sugar pine tortrix *Choristoneura lambertiana*	Lodgepole pine	Northern California	No significant activity was reported in 1991.
Tent caterpillar *Malacosoma* sp.	Antelope bitterbrush	Eastern California	Populations continued at very low levels throughout the Mono-Mammoth area.
Tessellated scale *Encalymnatus tessellatus*	Banana, Betelnut, Mango, Soursop	Federated States of Micronesia	No significant activity was reported in 1991.
Twig beetles *Pityophthorus* spp.	Ponderosa pine, Douglas-fir, White fir	Northern California	No significant activity was reported in 1991.

Pacific Southwest Region--Status of insects in California, Hawaii, American Samoa, the Commonwealth of the Northern Mariana Islands, the Territory of Guam, the Federated States of Micronesia, and the Trust Territory of Palau.

Insect	Host	Location	Remarks
Vegetable weevil *Listroderes obliquus*	Red fir	Northern California	No significant activity was reported from Humboldt Nursery.
Western pine beetle *Dendroctonus brevicomis*	Coulter pine, Ponderosa pine	California	Scattered mortality occurred on private lands in Lake, Napa, Mendocino, and Trinity Counties. Mortality on Federal lands also was scattered and apparently less than in 1990 in northwestern California. Mortality occurred throughout the lower to mid-elevation west side pine and mixed conifer stands of the Sierra Nevada Mountains. Concentration of mortality shifted southward to the southern end of the range, e.g., Madera and Mariposa Counties. In southern California, mortality in stands of Coulter pine continued at high levels in San Diego and Riverside Counties.
Western pine shoot borer *Eucosma sonomana*	Ponderosa pine	Northern California	No significant activity was reported in 1991.
Western yellowjacket *Vespula pennsylvanica*	Native insects and animals, Humans	Hawaii	This is an introduced insect that remains a public health concern. No significant activity reported.
White fir needleminer *Epinotia meritana*	White fir	Northern California	No significant activity was reported in 1991.
Woolly whitefly *Aleurothrixus floccosus*	Cherry, Citrus, Guava	Guam, Northern Mariana Islands	This pest has been introduced from the tropical and subtropical Americas.

Pacific Southwest Region--Status of insects in California, Hawaii, American Samoa, the Commonwealth of the Northern Mariana Islands, the Territory of Guam, the Federated States of Micronesia, and the Trust Territory of Palau.

Pacific Southwest Region Diseases

Prepared by Susan J. Frankel

Disease	Host	Location	Remarks
Stem and Branch Diseases			
Botryosphaeria canker *Botryosphaeria ribis*	Ceanothus, Chamise, Manzanita	Southern California	The fungus is associated with dieback of chaparral species in several counties in southern California. The plants are predisposed to fungal infection by drought and air pollution. The dead brush plants posed a severe fire hazard.
	Coast redwood, Giant sequoia	Northern California	In northern California the fungus is killing branches and tops of redwood and sequoias planted at low-elevation dry sites.
Dwarf mistletoes *Arceuthobium* spp.	Douglas-fir, Pines, True firs	California	The abundance and distribution of dwarf mistletoes changes only gradually over time. Mistletoes infected conifers on about 2.3 million acres of commercial land, and contributed to an estimated 100 million cubic feet of mortality. Dwarf mistletoe was associated with branch flagging in red fir and white fir throughout the central and southern Sierra Nevadas. Drought stress, bark beetles, and cytospora canker were contributory factors in this pest complex.
Fusicoccum canker *Fusicoccum* sp.	Pacific madrone	Santa Cruz, Mendocino and Lake Counties, California	The fungus caused branch dieback and cankers in madrone throughout much of northern California.
Pitch canker *Fusarium subglutinans*	Aleppo pine, Bishop pine, Italian stone pine, Monterey pine	Central coastal California and three locations in southern California	Pitch canker continues to cause branch dieback in planted trees in Santa Cruz and Alameda Counties. Some of the moderately-to-heavily infected trees are killed by pine engraver beetle and/or red turpentine beetle. The fungus has not been found in native pine stands; only park, roadside, and other ornamental trees are affected.

Pacific Southwest Region--Status of diseases in California, Hawaii, American Samoa, the Territory of Guam, the Commonwealth of the Northern Mariana Islands, the Federated States of Micronesia, and the Republic of Palau.

Disease	Host	Location	Remarks
Phomopsis canker *Phomopsis lokoyae*	Douglas-fir	Northern California	The fungus was involved in branch flagging and top-killing of sapling and pole-sized trees in overstocked or brushy areas. Damage appeared to be related to drought stress. Disease was less prevalent than in 1990.
True mistletoe *Phoradendron* spp.	Oaks, Sycamores, Other hardwoods	California	True mistletoes continue to reduce host vigor by taking moisture and nutrients from trees' conductive systems. Infections are common throughout the state.
Western gall rust *Peridermium harknessii*	Bishop pine, Lodgepole pine, Ponderosa pine, Monterey pine	Northern California	This rust caused branch flagging on larger trees and mortality of smaller regeneration trees.
White fir mistletoe *Phoradendron bolleanum* ssp. *pauciflorum*	White fir	Central and southern California	The parasitic plant is widespread in forest stands throughout the southern half of the state.
White pine blister rust *Cronartium ribicola*	Sugar pine, Western white pine	Central and northern California	This disease was reported throughout the Sierra Nevada and northern mountains. Resistant sugar pine were sprayed with carbaryl to protect them against red turpentine and mountain pine beetle attack.
Root Diseases			
Annosus root disease *Heterobasidion annosum*	Conifers, Some hard-woods	California	About 1.5 million acres of pine type and 0.7 million acres of true fir type were infected with this disease.
Armillaria root disease *Armillaria* sp.	Conifers, Some hard-woods	California	The disease is widespread in ornamental plantings, and was reported to be killing Douglas-fir, tanoak, Sitka spruce, maple, Modesto ash, dogwood, and other species.
Black stain root disease *Leptographium wageneri*	Douglas-fir, Jeffrey pine, Pinyon pine, Ponderosa pine, Singleleaf pine	California	Many Douglas-fir plantations in northwestern California continue to report black stain as the cause of thinning and regeneration problems. Black stain is also killing thousands of Jeffrey, ponderosa, and pinyon pine trees in mature stands.
Flame tree root disease *Phellinus noxious*	Flame tree	Northern Mariana Islands	Continues to cause mortality of high-visibility trees in Saipan and forest trees in Rota.

Pacific Southwest Region--Status of diseases in California, Hawaii, American Samoa, the Territory of Guam, the Commonwealth of the Northern Mariana Islands, the Federated States of Micronesia, and the Republic of Palau.

Disease	Host	Location	Remarks
Norfolk Island pine decline *Unknown*	Norfolk Island pine	Hawaii	The pine decline is present on Kauai Island. The syndrome appears as a tree dieback in discrete centers within stands.
Port-Orford-cedar root disease *Phytophthora lateralis*	Port-Orford-cedar Pacific yew	Northern California	This disease remains limited to the Smith River drainage in California (Del Norte County), except for a few small infestions on the Siskiyou National Forest (Siskiyou County). The disease has been identified on Pacific Yew within some of these infested areas.
Foliage Diseases			
Elytroderma needle disease *Elytroderma deformans*	Jeffrey pine, Ponderosa pine	California	This needle disease was common in the Sierra Nevada. Infection ratings are being used in salvage marking guides.
Vascular Wilts			
Dutch elm disease *Ceratocystis ulmi*	Elm	San Francisco Bay Area, Sacramento, Central Valley, California	Overall detection of diseased elms increased 25 percent over 1990 levels. Detections are primarily limited to disease spread within previously infested areas. Resistant elms have been planted in four Bay Area locations.
Nursery Diseases			
Alder leaf spot *Septoria alnifolia*	Red alder, White alder	Northern California	The number of alders planted and disease severity increased from 1990. The fungus causes leaf spots and stem lesions, and is fatal on small seedlings.
Cedar leaf blight *Didymascella thujina*	Western red-cedar	Northern California	2-0 and P-1 cedar were partially defoliated by this fungus. Damage was less severe than in 1990, and was primarily limited to cosmetic injury.
Fusarium diseases *Fusarium* spp.	Douglas-fir, Ponderosa pine, Sugar pine, True fir	California	Fusarium continues to cause damping-off, root rot, and hypocotyl rot of seedlings of various ages.
Phoma blight *Phoma* sp.	Douglas-fir, Red fir	Northern California	Level of Phoma blight infection remains low, causing minor damage.
Sirococcus tip blight *Sirococcus strobilinus*	Jeffrey pine	Northern California	Tip blight deformed and killed 1-0 Jeffrey pine.

Pacific Southwest Region--Status of diseases in California, Hawaii, American Samoa, the Territory of Guam, the Commonwealth of the Northern Mariana Islands, the Federated States of Micronesia, and the Republic of Palau.

Disease	Host	Location	Remarks
Abiotic Damage			
Drought and heat injury	Pines, True firs, Redwoods	California	Over 25 percent of the red and white fir in the Lake Tahoe Basin are dead due to drought. The large amount of dead and dry material has increased the threat of wildfires. In the 18 California National Forests, an average of 10 percent of the trees have died due to moisture stress.
Freeze injury	Conifers, Hardwoods	California	Severe cold temperatures in December 1990 and January 1991 led to considerable tree and shrub dieback throughout the State.
Ozone injury	Jeffrey pine, Ponderosa pine	Central and southern California	The amount of visible foliar ozone injury to pines in the southern Sierra Nevada has decreased over the last 5 years. This coincides with a period of drought stress that presumably causes ponderosa pine and Jeffrey pine to reduce their photosynthetic activity and take up less ozone.
Salt damage	Conifers, Shrubs	Lake Tahoe Basin, California	Dieback and mortality due to road de-icing was apparent in the Lake Tahoe area and areas along some other highways in northern California.
Other Diseases			
Koa tree decline *Unknown*	Koa	Hawaii	Prevalent on Oahu Island. Trees die suddenly after a period of branch dieback. The cause is unknown, but *Fusarium*, a beetle borer, and a leafhopper are associated with the problem.
Mamane tree decline *Unknown*	Mamane	Hawaii	Common on Hawaii island, this decline causes branch dieback, brooming, and swelling of stems.
Uluhe fern die-off *Unknown*	Uluhe fern	Hawaii	A leafhopper is associated with this decline. The Uluhe fern serves as quick cover for scarred lands.

Pacific Southwest Region--Status of diseases in California, Hawaii, American Samoa, the Territory of Guam, the Commonwealth of the Northern Mariana Islands, the Federated States of Micronesia, and the Republic of Palau.

Pacific Northwest Region Insects

Prepared by Iral Ragenovich

Insect	Host	Location	Remarks
Douglas-fir beetle *Dendroctonus pseudotsugae*	Douglas-fir	Oregon, Washington	Douglas-fir beetle damage decreased significantly throughout the Region. Affected acres decreased from 263,000 acres in 1990 to 103,021 acres in 1991. The greatest damage in 1991 was on the Wallowa-Whitman National Forest. In Washington, Douglas-fir beetle decreased in all areas, except the Colville National Forest, where damage remained at about the same level as the previous year.
Douglas-fir tussock moth *Orgyia pseudotsugata*	True firs	Eastern Oregon	An aerial suppression project was conducted on 116,000 acres on the Wallowa-Whitman National Forest using the biological insecticide *Bacillus thuringiensis* (*B.t.*) at a rate of 24 billion international units (BIUs) per acre. Early warning trapping and population sampling in the summer and fall of 1991 indicated that only localized population increases could occur, but no Regionwide outbreak was expected in 1992. Defoliation was not observed from the air because Douglas-fir tussock moth populations occurred in areas with western spruce budworm defoliation.
Fir engraver beetle *Scolytus ventralis*	True firs	Oregon, Washington	Fir engraver activity increased in Oregon and Washington. Total losses occurred on 544,527 acres (32.3 million cubic feet), as compared with 524,800 acres (17.9 million cubic feet) in 1990. Fir engraver-caused mortality decreased in the Blue Mountains of northeastern Oregon. Most notable increases occurred on the Ochoco, Rogue River, Freemont, and Winema National Foests in central and southcentral Oregon.

Pacific Northwest Region--Status of insects in Oregon and Washington.

Insect	Host	Location	Remarks
Gypsy moth (European form) *Lymantria dispar*	Conifers, Hardwoods	Oregon, Washington	Only 23 gypsy moths were trapped in Oregon in 1991. A 500-acre eradication project is planned near Cave Junction, Oregon, in 1992. In Washington, moths were primarily trapped around the Puget Sound area, and in northeast Washington, near Colville. Two 70-acre projects were planned, one near Colville and one near Mt. Vernon, Washington.
Gypsy moth (Asian form) *Lymantria dispar*	Conifers, Hardwoods	Oregon, Washington	Asian gypsy moth egg masses were found on grain ships coming from Siberian ports and arriving in Pacific Northwest ports. Currently, there is an ongoing outbreak of the gypsy moth in the vicinity of the Siberian ports. Trapping was increased around shipping ports and along the Columbia River. Several moths trapped in the Tacoma area and one moth trapped in northwest Portland were identified as the Asian gypsy moth. Steps were taken to initiate an eradication project in both areas. Asian gypsy moths were also trapped in Vancouver, British Columbia.
Modoc budworm *Choristoneura retiniana*	Douglas-fir, True firs	Southern Oregon	No Modoc budworm defoliation was detected from the air in 1991.
Mountain pine beetle *Dendroctonus ponderosae*	Jeffrey pine, Lodgepole pine, Ponderosa pine, Sugar pine, Western white pine	Oregon, Washington	The number of acres (405,055) and the volume affected (8.73 million cubic feet) did not differ significantly from those reported in 1990. Acres and volume decreased in all affected species, except ponderosa pine. Most notable was the continuing decline in the lodgepole pine type. Both acres and volume of ponderosa pine affected almost doubled. In 1991 there were 226,547, acres as compared to 132,029 acres in 1990; and 2.25 million cubic feet as compared to 1.1 million cubic feet in 1990. Forests experiencing the most significant increases were the Ochoco, Malheur, and Umatilla.
Pine engraver beetles *Ips* spp.	Poderosa pine	Oregon, Washington	Pine engraver activity continued to decline from 8,971 acres in 1990, to 2,651 acres in 1991.

Insect	Host	Location	Remarks
Spruce beetle *Dendroctonus rufipennis*	Engelmann spruce	Oregon, Washington	Spruce beetle killed 64,644 trees (24,100 acres, 3.04 million cubic feet) in 1991. This represented a decrease in acres affected (49,000), but an increase in the number of trees and volume (2.8 million cubic feet) from 1990. The outbreak on the Wallowa-Whitman National Forest decreased in number of acres, from 41,600 acres in 1990 to 18,778 acres in 1991; however, trees killed and volume lost remained about the same.
Western pine beetle *Dendroctonus brevicomis*	Ponderosa pine	Oregon, Washington	Tree mortality decreased significantly, from 190,400 acres in 1990 to 64,200 acres in 1991, and from 13.1 million cubic feet in 1990 to 11.3 million cubic feet in 1991. Mortality decreased in the larger pines, but numbers of trees killed increased in pole-sized pines.
Western spruce budworm *Choristoneura occidentalis*	Douglas-fir, Engelmann spruce, True firs, Western larch	Oregon, Washington	After a 3-year decrease, defoliation from western spruce budworm increased to 2.7 million acres in 1991, and it continued to increase to 4.75 million acres in 1991. The increase in defoliation occurred on all acres where western spruce budworm occurs. No western spruce budworm suppression projects were conducted in 1991 on Federal lands; however, an analysis was done on the Umatilla and Wallowa-Whitman National Forests, and about 195,000 acres of national forest and private land are planned for treatment in 1992.

Pacific Northwest Region--Status of insects in Oregon and Washington.

Pacific Northwest Region Diseases

Prepared by Ellen Michaels Goheen

Disease	Host	Location	Remarks
Stem and Branch Diseases			
Branch cankers *Phomopsis* spp. *Sclerophoma* spp. *Dermea* spp. *Cytospora* spp.	Douglas-fir, True firs	Oregon, Washington	Top, branch, and whole-tree mortality associated primarily with drought and secondarily with complexes of canker fungi occurred in plantations and pole-size stands located in the southwestern portion of the region. Canker fungi were found in association with true fir dwarf mistletoe throughout the Region.
Dwarf mistletoes *Arceuthobium* spp.	Various conifers	Oregon, Washington	The impact from dwarf mistletoes in Washington and Oregon changes little from year to year; however, long-term losses in unmanaged stands are great. Dwarf mistletoes were present on 9.5 million acres, and caused an estimated loss of 131 million cubic feet of timber. All conifer species are affected to some degree. Most of the damage occurred east of the Cascade crest. Douglas-fir dwarf mistletoe was the most damaging tree disease in stands east of the Cascades, infecting 42 percent of the host type. Western larch dwarf mistletoe causes serious damage in northcentral Washington.
Stem decay *Phellinus pini* *Echinodontium tinctorium* Other Basidiomycetes	Various conifers	Oregon, Washington	Stem decay fungi still consume enormous volumes of wood. Most losses occurred in younger stands on thin-bark species, which are susceptible to wounding during stand entries. Wounding of residual trees both activates dormant infections and creates excellent infection courts.

Disease	Host	Location	Remarks
White pine blister rust *Cronartium ribicola*	Sugar pine, Western white pine	Oregon, Washington	White pine blister rust caused mortality throughout the range of western white pine and sugar pine, and prevented the management of susceptible trees on high-hazard sites. Annual losses in Oregon and Washington are estimated to be 15 million cubic feet. Rust-resistant planting stock is available for regenerating stands. Approximately 6,227 and 980 acres of rust-resistant western white pine and sugar pine, respectively, were planted in the Region during 1991. Interest in pruning white pine stands continues to increase.
Root diseases			
Root disease	Various conifers	Oregon, Washington	Root diseases are among the most serious pest problems in Oregon and Washington forests because of the magnitude of losses and the difficulty of treatment. Reports of root disease incidence increase as use of stand examinations to detect root disease increase. Annual losses to root diseases on all ownerships are estimated at over 185 million cubic feet. Tolerant, resistant, and immune tree species were planted on some affected sites to limit future losses.
Annosus root disease *Heterobasidion annosum*	True firs, Western hemlock, Ponderosa pine	Oregon, Washington	Annosus root disease was responsible for extensive losses in many partially cut white and grand fir stands in southern and eastern Oregon and eastern Washington. Mortality was high in drought-stricken areas of northeastern Oregon where annosus root disease and fir engraver beetles operated as a complex. Evidence points to extensive infection throughout eastern portions of the Region. Disease severity in these stands is expected to increase with time. Annosus root disease was observed with increasing frequency in ponderosa pine stands on very dry sites in eastern Washington and eastern Oregon. Concern regarding the impacts of annosus root disease on mountain hemlock and Pacific silver fir in high-elevation stands in the Cascades increased. Over the Region, use of borax as a stump protectant to prevent annosus root disease on susceptible conifers increased.

Pacific Northwest Region--Status of diseases in Oregon and Washington.

Disease	Host	Location	Remarks
Armillaria root disease *Armillaria ostoyae*	Various conifers	Oregon, Washington	The most serious losses to this disease occurred east of the Cascades in mixed-conifer stands. In localized areas, ponderosa pine was seriously damaged. Losses west of the Cascades were usually confined to stressed stands, such as off-site plantings. Planting or favoring tolerant or resistant species was recommended as a control measure.
Laminated root rot *Phellinus weirii*	Douglas-fir, Grand fir, White fir	Oregon, Washington	Laminated root rot was the most serious forest tree disease west of the Cascades in Washington and Oregon. Where the disease occurs Douglas-fir and true fir productivity has been reduced 50 percent. West of the Cascade Mountains, an estimated 8 percent of the Douglas-fir and true firs have been taken out of production. East of the Cascades, grand and white fir stands experienced severe damage. Tolerant, resistant, and immune species were favored or planted in an effort to suppress this disease.
Port-Orford-cedar root disease *Phytophthora lateralis*	Port-Orford-cedar, Pacific yew	Southwestern Oregon	Port-Orford-cedar root disease causes mortality of Port-Orford-cedar in southwestern Oregon. Disease control strategies are being analyzed for all projects where Port-Orford-cedar may be affected. These strategies are reducing disease spread on a project-by-project basis. Resistance to the fungus is being tested using artificial inoculation techniques. *P. lateralis* has been isolated from dead Pacific yew on the Illinois Valley, Gold Beach, and Powers Ranger Districts of the Siskyou National Forest. Occurrence of the fungus on Pacific yew has thus far been limited to locations where Port-Orford-cedar and yew are intermingled within the same project areas. Monitoring is ongoing to determine the range and severity of the disease on yew.
Tomentosus root rot *Inonotus tomentosus*	Engelmann spruce	Oregon, Washington	Tomentosus root and butt rot was found commonly in stands dominated by mature and older Engelmann spruce. Root and butt rot predispose trees to windthrow or collapse. Trees are seldom killed outright. Windthrow associated with this disease maintains endemic populations of spruce beetle at high elevations.

Pacific Northwest Region--Status of diseases in Oregon and Washington.

Disease	Host	Location	Remarks
Vascular Wilts and Declines			
Black stain root disease *Ophiostoma wageneri (=Leptographium wageneri)*	Douglas-fir, Ponderosa pine	Oregon, Washington	In southwestern Oregon, black stain root disease was the most commonly encountered disease in Douglas-fir plantations. It was particularly damaging where disturbances, such as road building or soil compaction, had occurred or where roadside Douglas-fir was cut by mechanical choppers. Losses were also greater on tractor-logged sites, which have greater soil compaction, than on cable-logged sites. Black stain root disease on ponderosa pine has been observed with increasing frequency in eastern Oregon. Numerous centers have been identified over a large area of the Burns Ranger District, Malheur National Forest.
Foliage Diseases			
Dothistroma needle blight *Mycosphaerella pini [Dothistroma septospora (=Dothistroma pini)]* **Douglas-fir needle cast** *Rhabdocline pseudotsugae* **Elytroderma needle disease** *Elytroderma deformans* **Larch needle cast** *Meria laricis* **Swiss needle cast** *Phaeocryptopus gaeumannii*	Douglas-fir, Lodgepole pine, Ponderosa pine	Oregon, Washington	The incidence of several foliage diseases increased during 1991 due to favorable microclimatic conditions. Larch needle cast was prevalent throughout northeastern Washington. Swiss needle cast was common in Douglas-fir plantations in northwestern Oregon. Elytroderma needle cast was common on pine sites in northcentral Washington. Infection levels and damage were most severe in the 3,500 feet elevation zone.

Pacific Northwest Region--Status of diseases in Oregon and Washington.

Disease	Host	Location	Remarks
Nursery Diseases			
Damping-off	Most conifers	Oregon, Washington	Loss of seedlings before and shortly after emergence averaged approximately 1 percent in Pacific Northwest bareroot nurseries. Fumigation, deep watering, and delayed fertilization helped control damping-off.
Douglas-fir canker diseases *Phoma eupyrena* *Fusarium roseum* *Phomopsis* spp.	Douglas-fir	Oregon, Washington	Damage was scattered, with less than 1 percent of the crop affected in most nurseries. Fungicide applications were helpful when cankers were above ground and not covered with soil collars.
Gray mold *Botrytis cinerea*	Douglas-fir	Oregon, Washington	Damage by gray mold has been low (less than 1 percent of the crop was affected) due to applications of preventative fungicide, regulation of seedbed densities, and prompt removal of dead material, including pruned tops, from nursery beds.
Fusarium root and hypocotyl rots *Fusarium oxysporum*	Various conifers	Oregon, Washington	Scattered losses for most species.
Larch needle cast *Meria laricis*	Western larch	Washington	Major infection and defoliation occurred at one nursery.
Phytophthora root rot *Phytophthora* spp.	Douglas-fir, Other conifers	Oregon, Washington	Seedbed seedling damage was confined primarily to nursery beds with poor drainage or compaction layers in the rooting zone. Soil wrenching maintained a well-drained, loose soil profile at one nursery, nearly eliminating phytophthora problems.

Pacific Northwest Region--Status of diseases in Oregon and Washington.

Southern Region Insects

Prepared by Russell A. McKinney and Patrick J. Barry

Insect	Host	Location	Remarks
Ambrosia beetle *Xyleborus* spp.	Pines, Hardwoods	South Carolina	Several pole mills in the hurricane Hugo (1989)-damaged area continued to report beetle attacks on peeled poles.
Bagworms *Thyridopteryx ephemeraeformis*	Bald cypress, Eastern redcedar, Spruce, Evergreen ornamentals	Regionwide	Light infestations were reported in North Carolina and Tennessee.
Balsam woolly adelgid *Adelges piceae*	Fraser fir	North Carolina, Tennessee, Virginia	Populations were high again this year. Mortality continues throughout the range of Fraser fir in the southern Appalachian Mountains.
Black-headed pine sawfly *Neodiprion excitans*	Southern pines	Texas	Several localized areas in Tyler County with limited mortality expected.
Black turpentine beetle *Dendroctonus terebrans*	Southern pines	Regionwide	Damage was moderate throughout the Region. Some isolated reports of mortality occurred in the eastern portions of North Carolina and statewide in Tennessee. Occurring in river bottoms and drainages with low water tables in Florida.
Black twig borer *Xylosandrus compactus*	Hardwoods	Florida, Georgia, North Carolina, South Carolina	Incidence of this introduced ambrosia beetle increased. It sometimes was found in association with fusarium canker--especially in shade trees.
Buck moth *Hemileucia maia*	Oaks	Louisiana, Tennessee, Virginia	Defoliation was prominent in Tennessee on ridge tops and the upper slopes of forest stands of the Western Highland Rim. Scattered throughout Virginia, causing light damage. Moderate to severe defoliation on 15,000 acres in New Orleans.

Southern Region--Status of insects in Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia; and in Puerto Rico and the Virgin Islands.

Insect	Host	Location	Remarks
Coneworms *Dioryctria amatella* *Dioryctria clarioralis* *Dioryctria disclusa* *Dioryctria merkeli*	Southern pines	Regionwide	Late season attacks caused extensive damage to several orchards across the South. One orchard in Florida reported losses of nearly 30 percent of the cone crop. Early season damage by *D. disclusa* was minimal across the south, with most orchards reporting losses of less than 5 percent.
Eastern tent caterpillar *Malacosoma americanum*	Hardwoods, especially Black cherry	Regionwide	Heavy defoliation occurred in western Tennessee and Arkansas. Alabama, North Carolina, and Virginia reported damage everywhere that roadside cherry occurred.
Fall cankerworm *Alsophila pometaria*	Hardwoods	North Carolina, Tennessee, Virginia	Heavy defoliation occurred in localized areas of southwestern Virginia and eastern Tennessee. Defoliation was reported in North Carolina.
Fall webworm *Hyphantria cunea*	Hardwoods	Regionwide	Two generations of the webworm were reported in South Carolina, North Carolina,and Tennessee. Activity was widespread throughout each state, with light to moderate defoliation in Louisiana. Populations declined in Arkansas and Oklahoma.
Forest tent caterpillar *Malacosoma disstria*	Hardwoods	Alabama, Arkansas, Louisiana, North Carolina, South Carolina, Tennessee, Texas, Virginia	Widespread light defoliation was reported in eastern North Carolina with moderate defoliation along the Roanoke River drainage. Light, scattered defoliation was observed in Tennessee and Virginia. Severe defoliation occurred in western Mississippi and throughout Louisiana, but overall population levels are declining. Build-ups occurred in Texas and Arkansas.
Fruittree leafroller *Archips argyrospila*	Bald cypress	Louisiana	Defoliation of 160,000 acres resulted in growth loss and dieback valued at $1.139 million. Damage was limited to the Atchafalaya Basin area of southcentral Louisiana.

Insect	Host	Location	Remarks
Gypsy moth *Lymantria dispar*	Hardwoods	North Carolina, Tennessee, Virginia	Defoliation occurred on 616,300 acres of host type mainly within northern Virginia. Defoliation on Federal lands includes 274,900 acres of the George Washington National Forest. The Forest estimates 22,500 acres of severe mortality in 1991. A total of 38,500 acres have sustained mortality greater than 50 percent. There were 20 acres defoliated on the Jefferson National Forest, and 95,600 acres on the Shenandoah National Park, with about 4,500 acres of tree mortality. Eight hundred acres were defoliated on the Blue Ridge Parkway. Virginia Division of Forestry estimated, based on limited forest inventories, that mortality on State and private lands in 1991 totaled 15 million cubic feet of timber. Isolated infestations were treated in North Carolina and Tennessee. Male moths were trapped in all states regionwide.
Hemlock woolly adelgid *Adelges tsugae*	Hemlock	Virginia	Isolated severe infestations were located on the Shenandoah National Park and on northern sections of the Blue Ridge Parkway. Some dieback and motality occurred.
Hickory bark beetle *Scolytus quadrispinosus*	Hickory	Regionwide	Considerable mortality reported in Orange County, North Carolina.
Introduced pine sawfly *Diprion similis*	White pine	North Carolina	No significant activity was reported in 1991.
Larch sawfly *Pristiphora erichsonii*	Larch	North Carolina	No significant activity was reported in 1991.
Larger elm leaf beetle *Monocesta coryli*	Elm	Mississippi	Scattered severe defoliation in southwest Mississippi.
Loblolly pine sawfly *Neodiprion taedae linearis*	Southern pines	Tennessee	Populations increased in central Tennessee.

Southern Region--Status of insects in Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia; and in Puerto Rico and the Virgin Islands.

Insect	Host	Location	Remarks
Locust leafminer *Odontota dorsalis*	Black locust	Mississippi, North Carolina, Oklahoma, Tennessee, Virginia	North Carolina reported severe outbreaks in Buncombe, Madison, and Yancey Counties, with scattered damage in the upper Piedmont and mountain areas. Moderate damage occurred across Tennessee. Widespread and unusually severe defoliation occurred in Virginia. In some cases, refoliated trees were defoliated a second time.
Nantucket pine tip moth *Rhyacionia frustrana*	Southern pines	North Carolina, Virginia	Damage was moderate to heavy in pine plantations in Orange and Granville counties in North Carolina. Virginia reported significant damage in the Costal Plain and Piedmont causing growth loss and deformity.
Oak clearwing borer *Paranthrene simulans*	Oaks	South Carolina	No significant activity was reported in 1991.
Oak skeletonizer *Bucculatrix ainsliella*	Oaks	Georgia	Activity was again observed over a large area in northern Georgia.
Orangestriped oakworm *Anisota senatoria*	Oaks	Regionwide, Tennessee, Virginia	Unusually high levels of activity were reported again in the southern Apppalachian Mountains, but no significant damage occurred.
Pales weevil *Hylobius pales*	Southern pines	Regionwide	Scattered moderate to heavy loblolly pine seedling mortality. Damage has been heavier this year than in the past. North Carolina reported damage to longleaf pine. This was unusual as longleaf is considered resistant to attack.
Periodical cicada *Magicicada septendecim*	Various hardwoods	North Carolina, Tennessee	Brood 14 of the periodical cicada caused considerable twig damage to many hardwoods in western counties of North Carolina. Eastern Tennessee and the Cumberland Plateau Region had moderate to heavy damage.
Phoberia moth *Phoberia atomaris*	Oaks	North Carolina	This insect defoliated oak in the central Piedmont. White oaks are sometimes attacked but post oak is preferred.
Pine engraver beetles *Ips avulsus* *Ips calligraphus* *Ips grandicollis*	Southern pines	Regionwide	Activity in Florida was primarily in river bottoms and drainages. Georgia, North Carolina, and South Carolina reported activity in the Piedmont. In Tennessee activity picked up statewide in the late summer and fall. Drought contributed to incidence in all cases.

Southern Region--Status of insects in Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia; and in Puerto Rico and the Virgin Islands.

Insect	Host	Location	Remarks
Pine needleminer *Exoteleia pinifoliella*	Southern pines	Florida	No significant activity was reported in 1991.
Pine spittlebug *Aphrophora parallela*	Southern pines	North Carolina, Tennessee, Virginia	A moderate amount of activity was observed throughout these states, with no significant impact.
Pine webworm *Tetralopha robustella*	Shortleaf pine	Arkansas	No significant activity was reported in 1991.
Psyllidae *Tetragonocephela flava*	Hackberry	Louisiana	Though populations remained low, widespread, significant dieback and tree mortality in the wake of the 1989 outbreak in a 10-parish area in Louisiana continued.
Redheaded pine sawfly *Neodiprion lecontei*	Southern pines	North Carolina, South Carolina, Tennessee, Texas	Scattered infestations were observed in the central and eastern portions of North Carolina, with no significant damage occurring. South Carolina reported an increase in activity statewide. Tennessee reported an increase in activity in young pine plantations.
Scale insects (Homoptera)	Southern pines	Regionwide	No significant activity was reported in 1991.
Seedbugs *Leptoglossus corculus* *Tetyra bipunctata*	Southern pines	Regionwide	Seedbug populations on slash and loblolly pines caused extensive damage in several states. On the Florida Divison of Forestry orchard near Munson and the Union Camp Orchard near Hampton, South Carolina, populations were high in untreated areas.
Slash pine flower thrips *Gnophothrips fuscus*	Southern pines	Regionwide	No significant activity was reported in 1991.
Slug oak sawfly *Caliroa* sp.	White oak	Georgia	This late-season defoliator was active again this year in portions of northern Georgia. Scattered damage occurred over thousands of acres.

Southern Region--Status of insects in Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia; and in Puerto Rico and the Virgin Islands.

Insect	Host	Location	Remarks
Southern pine beetle *Dendroctonus frontalis*	Southern pines	Regionwide	Activity increased in the Piedmont of Georgia, North Carolina, and South Carolina. Highest activity occurred in Alabama, Mississippi, Louisiana, and Texas.
Texas leafcutting ant *Atta texana*	Southern pines	Louisiana, Texas	Serious losses continued in pine plantations on deep sandy soils.
Variable oakleaf caterpillar *Heterocampa manteo*	Various hardwoods	Oklahoma, Texas	At least two generations were completed in east Texas, with 1,100,000 acres receiving slight to complete defoliation. Heavy activity persists in eastern Oklahoma.
Virginia pine sawfly *Neodiprion pratti pratti*	Southern pines	North Carolina, South Carolina, Tennessee, Virginia	Scattered infestations in the mountains of North Carolina declined. Activity in Tennessee increased, with some heavy defoliation. Activity in southwest Virginia also declined.
Walkingstick *Diapheromera femorata*	Hackberry, Pecan	Oklahoma	North-central Oklahoma reported light defoliation.
Whitefringed beetle *Graphognathus* spp.	Slash pine, Loblolly pine	Alabama, Florida, Georgia	Damage continued on pine seedlings in Conservation Reserve Program plantations.

Number of Infestations

State	1990	1991
Alabama	317	4,605
Arkansas	115	20
Florida	2	0
Georgia	363	4,303
Kentucky	0	0
Louisiana	326	4,509
Mississippi	1,168	5,628
North Carolina	1,199	475
Oklahoma	30	0
South Carolina	18,273	1,697
Tennessee	234	0
Texas	4,647	2,755
Virginia	30	170
Total	26,674	24,162

Southern Region--Status of insects in Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia; and in Puerto Rico and the Virgin Islands.

Insect	Host	Location	Remarks
White pine cone beetle *Conopthorus coniperda*	Eastern white pine	North Carolina, Tennessee	Beetle populations declined on the USDA Forest Service Beech Creek seed orchard. Populations increased on the North Carolina Forest Service orchard near Morganton, damaging 50 percent of the crop. In Tennessee, populations increased at some seed orchards.
White pine weevil *Pissodes strobi*	White pine	North Carolina, Tennessee, Virginia	Scattered light activity was reported from each state.
Yellow-poplar weevil *Odontopus calceatus*	Yellow-poplar	Tennessee	Activity reported in eastern Tennessee.

Southern Region Diseases

Prepared by William H. Sites and Dale A. Starkey

Disease	Host	Location	Remarks
Stem and Branch Diseases			
Butternut canker *Sirococcus clavigignenti-juglandacearum*	Butternut	Throughout range of butternut	This disease has eliminated most of the butternut in the Southern Region.
Canker rot *Inonotus hispidus*	Oak	Regionwide	Canker rot is a main stem problem. It was scattered throughout much of the oak region.
Cankers *Botryosphaeria ribis*	Hardwoods	Regionwide	This disease was scattered throughout the Region, causing severe damage in localized areas.
Chestnut blight *Cryphonectria parasitica* (=*Endothia parasitica*)	Exotic chestnuts, Native chestnuts, Scarlet oak	Throughout host ranges	Large chestnuts have been eliminated. Damage to sprouts continued. Butt swell and rot result on scarlet oak in some areas.
Comandra blister rust *Cronartium comandrae*	Shortleaf pine	Arkansas, Tennessee	No significant activity was reported in 1991.
Fusiform rust *Cronartium quercuum* f. sp. *fusiforme*	Loblolly pine, Slash pine	Regionwide, except Kentucky, Puerto Rico, U.S. Virgin Islands	This continued to be the most serious disease of southern pines. About 17 million acres were estimated to be affected at a 10 percent or greater incidence level. Annual losses in the South were estimated at over $47 million.
Hypoxylon canker *Hypoxylon atropunctatum*	Hickory, Oak	Regionwide	Common on dead and dying trees weakened by drought or other agents in forest and urban environments. Regional and local droughts in the 1980s increased disease incidence in the 1990s.
Kabatina twig blight *Kabatina* sp.	Eastern red-cedar	Tennessee	Occurred throughout central and western Tennessee on new growth.
Leyland cypress canker *Seiridium cardinale*	Leyland cypress	South Carolina	No significant activity was reported in 1991.

Southern Region--Status of diseases in Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia; and in Puerto Rico and the Virgin Islands.

Disease	Host	Location	Remarks
Pitch canker *Fusarium subglutinans* (=*Fusarium moniliforme* var. *subglutinans*	Southern pines, especially Loblolly pine, Slash pine	Regionwide	Pitch canker was widespread but not severe in slash, loblolly, and shortleaf pine plantations. Damage to urban trees was occasionally reported.
Slime flux *Erwinia* spp. *Clostridium* spp. and other bacteria	Oak, Maple, Other hardwoods	Regionwide	Infections were common in urban areas and storm-damaged forest stands.
Stem canker *Fusarium* spp.	Mahoe	Puerto Rico	No significant activity was reported in 1991.
Stem decay Basidiomycetes	All species, especially Hardwoods	Regionwide	Stem decay continued to be a serious problem and is common in stands damaged by fire, storms, and logging. This problem also causes hazardous trees in recreation areas.
Phellinus pini	Southern pines	Regionwide	Red heart disease is more prevalent in older stands. It is an important heart rot in nesting habitat for the red-cockaded woodpecker.
Twig canker *Sphaeropsis sapinea* (=*diplodia pinea*)	Austrian pine, Ponderosa pine, Spruce pine	Regionwide	No significant activity was reported in 1991.
Twig canker Atropellis canker *Atropellis* spp.	Native and exotic hard pines	Virginia	This disease was scattered statewide. Damage was more severe on exposed trees.
White pine blister rust *Cronartium ribicola*	Eastern white pine	North Carolina, Virginia	Found above 3,000 feet elevation, this disease was serious only in localized areas.

Root Diseases

Annosus root disease *Heterobasidion annosum*	Eastern white pine, Southern pines	Regionwide	Annosus root disease continued to be the most serious root disease in the South. Pine bark beetle infestations frequently occur in infected stands. The disease also resulted in hazardous trees in recreation areas.
Littleleaf disease *Phytophthora cinnamomi* and *Pythium* spp.	Loblolly pine, Shortleaf pine	Alabama, Georgia, Kentucky, North Carolina, South Carolina, Tennessee, Virginia	This disease was common in the Piedmont in natural and planted stands over 45 years of age. Incidence was reduced somewhat because of the widespread planting of less susceptible loblolly pine.

Southern Region--Status of diseases in Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia; and in Puerto Rico and the Virgin Islands.

Disease	Host	Location	Remarks
Procerum root disease *Leptographium procera*	Eastern white pine	Throughout host range	This disease was common throughout the Region. Incidence was lower than in 1990.
Root decay *Armillaria* spp. *Inonotus circinatus* *Phaeolus schweinitzii* *Ganoderma lucidum*	Most conifers, Hardwoods	Regionwide	Root decay was common in forest stands and urban environments, especially where stresses were severe, trees overmature, or root systems damaged. It was more common in areas with severe drought.
Sand pine root disease *Phytophthora cinnamomi* *Inonotus circinatus* var *circinatus* *Armillaria tabescens* *Leptographium procera*	Sand pine	Florida	The disease was common across the range of sand pine. Damage was most severe on Ocala sand pine.

Foliage Diseases

Anthracnose *Gnomonia* sp. *Kabatiella* sp. (= *Gloeosporium* sp.) *Apiognomonia* sp. (=*Gnomonia* sp.)	Hardwoods, especially Ash, Maple, Sycamore, Walnut	Regionwide	Incidence was higher in most areas in 1991 due to a wet spring. Maples defoliated early due to leaf disease.
Black gum mortality Unknown	Black gum	Georgia, North Carolina, Tennessee, Virginia	A new disease which causes foliage infections, twig cankers and tree death was discovered in 1991. The disease was widespread and commonly found with dogwood anthracnose.
Brown spot *Mycosphaerella dearnessii* (=*Scirrhia acicola*)	Longleaf pine	Throughout host range	This disease was locally severe in regeneration areas. The incidence remained constant in 1991.
Dogwood anthracnose *Discula* sp.	Flowering dogwood	Alabama, Georgia, Kentucky, North Carolina, South Carolina, Tennessee, Virginia	This disease has now been found in 144 counties in the mountains and Piedmont, an increase of 17 percent over 1990. The disease caused premature defoliation and tree death in much of the affected area, especially at higher elevations. In some areas above 3,000 feet, 100 percent mortality has occurred.

Southern Region--Status of diseases in Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia; and in Puerto Rico and the Virgin Islands.

Disease	Host	Location	Remarks
Needle casts of pine *Lophodermium* spp. *Ploioderma* spp. *Hypoderma* spp.	Pines	Regionwide	Needle cast symptoms were common throughout the South, particularly in the spring. The disease seems to be stable with no change from 1990 levels.
Oak leaf blister *Taphrina caerulescens*	Red oaks	Alabama, Arkansas, Louisiana, Mississippi, Oklahoma, Tennessee, Texas	The disease was scattered but not severe. It was unsightly on urban trees.
Pine needle rust *Coleosporium* spp.	Pines	Regionwide	Reported in scattered localities.
Powdery mildew *Uncinula macrospora* *Microsphaera* sp.	Elm, Oak	Regionwide	Reported in scattered localities.

Vascular Wilts and Declines

Cabbage palm mortality Unknown	Cabbage palm	Florida	Thousands of cabbage palm were reported dead or dying in areas along the Gulf of Mexico near Waccasassa Bay. Palms of all ages, but especially the older ones are affected. The affected trees have been examined for insect and disease damage, but no probable cause was determined.
Dutch elm disease *Ceratocystis ulmi*	Elms	Throughout host range	This disease continued at endemic levels in 1991.
Mimosa wilt *Fusarium oxysporum* f. sp. *perniciosum*	Mimosa	Throughout host range	No significant activity was reported in 1991.
Oak decline/mortality complex	Oaks, especially Red oak group	Regionwide	Decline and mortality were widely reported in the 1980s. Mortality was more frequent on or near ridges with shallow, rocky soils. Inventories in North Carolina during 1990-1991 found 973,000 acres affected in the state. The mountains had the highest incidence in oak forest types (20 percent). Incidence in other Regions was under 5 percent. Significant mortality was also reported in east Texas.

Southern Region--Status of diseases in Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia; and in Puerto Rico and the Virgin Islands.

Disease	Host	Location	Remarks
Oak wilt *Ceratocystis fagacearum*	Oaks	Arkansas, Kentucky, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia	Oak wilt continued to cause tree mortality in some localities. In 1991, new detections increased the number of counties with infection centers in North Carolina. Oak wilt continued to cause severe losses in red and live oak in central Texas. The disease has been confirmed in 46 Texas counties.
Spruce-fir decline and mortality	Fraser fir, Red spruce	North Carolina, Tennessee, Virginia	The balsam woolly adelgid has been killing Fraser fir since it was introduced into spruce-fir areas more than 25 years ago. A large number of spruce trees are exhibiting thinning crowns and dieback; in some cases they have died.
Verticillium wilt *Verticillium albo-atrum*	Norway maple, Silver maple	Tennessee	Caused twig and limb dieback.
Nursery Diseases			
Anthracnose *Colletotrichum* sp.	Russian olive	Texas	No significant activity was reported in 1991.
Damping-off *Fusarium* spp. *Cylindrocladium* spp. *Phytophthora* spp. *Pythium* spp. *Rhizoctonia* spp.	Many Conifers and Hardwoods	Regionwide	Chronic losses were typified by reduced and irregular density in the seedbeds. Damage was more severe in 1991 due to the wet spring.
Diplodia blight *Sphaeropsis sapinea*	Scotch pine	Oklahoma	15,000 Scotch pine seedlings were lost at an Oklahoma nursery this year.
Fusiform rust *Cronartium quercuum* f. sp. *fusiforme*	Loblolly pine, Longleaf pine, Slash pine	Regionwide	In 1991, less than 1 percent of the trees in nurseries were affected due to the use of fungicides.
Pitch canker *Fusarium subglutinans*	Shortleaf pine, Virginia pine	North Carolina, South Carolina	Contaminated seed from damaged orchards resulted in nursery and outplanting mortality.
Rhizoctonia needle blight *Rhizoctonia* spp.	Longleaf pine	Alabama, Louisiana, Mississippi	No significant activity was reported in 1991.

Southern Region--Status of diseases in Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia; and in Puerto Rico and the Virgin Islands.

Disease	Host	Location	Remarks
Root rot *Fusarium* spp., *Macrophomina phaseolina* *Phytophthora* spp. *Pythium* spp.	Eastern white pine, Loblolly pine, Slash pine, Virginia pine	Regionwide	Root rots continued as chronic problems in environments where seedlings were under stress from excessive or inadequate moisture or soil conditions. Planting failures continued on former agricultural fields in Florida.
Tip blight *Phoma* sp.	Loblolly pine, Longleaf pine	Regionwide	300,000 seedlings were lost at an industry nursery in Texas.

Seed Orchard Diseases

Canker diseases *Lasiodiplodia* sp. Unidentified fungi	Northern red oak	Tennessee	Branch dieback and some mortality continued in 1991.
Cone damage *Lasiodiplodia* sp.	Eastern white pine	North Carolina	No significant activity was reported in 1991.
Pitch canker *Fusarium subglutinans*	Southern pines, especially Loblolly pine, Slash pine	Regionwide	Pitch canker continued as a serious problem in some orchards causing dieback, cone loss and seed infection.
Root diseases *Armillaria* spp. *Armillaria tabescens* (=*Clitocybe tabescens*) *Heterobasidion annosum* *Inonotus circinatus* *Verticicladiella procera*	Eastern white pine, Shortleaf pine	North Carolina, South Carolina	No significant activity was reported in 1991.
Seed fungi *Lasiodiplodia* sp. Unidentified fungi	Northern red oak	Tennessee	Several fungi were associated with diseased acorns in one of the first crops from a 20-year-old seedling seed orchard. Insect damage was coincident on some diseased acorns.

Southern Region--Status of diseases in Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia; and in Puerto Rico and the Virgin Islands.

Disease	Host	Location	Remarks

Abiotic Damage

Animal damage	Yellow poplar All species	North Carolina	Voles killed 10 percent of 2-year old yellow poplar seedlings. Increased beaver activity near water courses resulted in damage to all species of trees.
Atmospheric deposition symptoms	Bioindicators such as Ash, Blackberry, Sweetgum Yellow poplar	Georgia, North Carolina, South Carolina, Virginia	No significant activity was reported in 1991.
Drought	Hickory, Oak	Regionwide, North Carolina	Drought was scattered, but common throughout the region. Portions of the Virginia plateau were especially hard hit.
Frost	Various species	North Carolina, Tennessee	No significant activity was reported in 1991.
Ozone injury	Eastern white pine, various bioindicator species	Southwide	Tipburn was observed in some eastern white pine families. Indicator plants were used to assess ozone levels in wilderness areas. Symptoms were found througout the South in 1991.
Wind injury	Various species	North Carolina, Puerto Rico, Texas, Virginia	No significant activity was reported in 1991.

Eastern Region / Northeastern Area Insects

Prepared by S. Cox, M. Miller-Weeks, M. Mielke, F. Peterson, and D. Twardus

Insect	Host	Location	Remarks
Aphids *Periphyllus spp.*	Sugar maple	Vermont	No significant activity was reported in 1991.
Arborvitae leaf miner *Argyresthia thuiella*	Northern white cedar	Maine, Vermont	In Maine, leaf miner populations, although variable, generally declined from last year. Statewide monitoring indicates that growth losses are occurring in many locations. In northern Vermont, there were numerous reports of damage caused by this pest.
Aspen webworm *Tetralopha aplastella*	Aspen	Minnesota	There was widespread aspen webworm defoliation in seven northeastern Minnesota counties. However, this was not considered a serious problem.
Balsam gall midge *Paradiplosis tumifex*	Balsam fir	Maine, New York, Vermont	Maine experienced moderate to heavy defoliation over approximately 1,000 acres on scattered Christmas tree plantations. Several of these gall midge infestations were severe enough to require control actions. More than 8,000 acres were affected in northern New York. In Vermont, damage to Christmas tree plantations was considered less severe than in previous years.
Balsam twig aphid *Mindarus abietinus*	Balsam fir	Maine, Vermont	About 4,000 acres in Maine were reported infested by the balsam twig aphid. Some of the infestations have been recurring over the past three years and have involved valuable Christmas trees. Some infestations were severe enough to warrant spraying with pesticides. In Vermont, damage from this pest was more widespread than in 1990. It is predicted that damage will likely decrease in the older infested areas within the state, and increase in the newer areas.

Eastern Region and Northeastern Area--Status of insects in Connecticut, Delaware, Illinois, Indiana, Iowa, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont, West Virginia, and Wisconsin.

Insect	Host	Location	Remarks
Balsam woolly adelgid *Adelges piceae*	Balsam fir	Maine, Vermont	This insect was found throughout most of central and southern Maine, where populations have declined partly because of changes in fir stocking. Infestations were also found in the state's costal areas, where it was observed in various phases of its life cycle on host plants. Adelgids were observed in southern Vermont following several years of continued low populations.
Basswood thrips *Thrips calcaratus*	Basswood		No significant activity was reported in 1991.
Birch casebearer *Coleophora serratella*	White birch	Maine	Scattered defoliation was recorded on over 100,000 acres in central and eastern portions of the state. Populations were higher than expected in costal areas. The insect was also present in the northern counties.
Birch leafminers *Fenusa pusilla* and *Messa nana*	Gray birch, White birch, Yellow birch	Maine, Vermont	*M. nana* populations were high in some locations in central and eastern coastal portions of Maine, affecting over 120,000 acres. Damage from this pest was widespread in southern Vermont with 5,000 acres of defoliation. Over 25,000 acres were moderately to heavily defoliated in northern Vermont by *F. pusilla*.
Birch skeletonizer *Bucculatrix canadensisella*	Gray birch, White birch, Yellow birch	Maine, New York, Vermont	Moderate to severe late-season defoliation on 10,000 acres in Maine was most visible on higher-elevation white birch sites in the western portion of the state. Defoliation was up strikingly from last year. Over 12,000 acres were affected in the Adirondack region of New York, with about half of the area defoliated. In Vermont, there were scattered occurrences of moderate to heavy defoliation.
Black turpentine beetle *Dendroctonus terebrans*	Japanese black pine	New York, Rhode Island	The pest caused severe damage on Long Island, New York. In Rhode Island the beetles spread throughout Japanese black pine stands on Block Island and in Newport County. Tree mortality was variable.
Bronze birch borer *Agrilus anxius*	White birch	Michigan, Minnesota, Wisconsin	White birch continued to be attacked in northern regions of these states, where the effects of the 1987-89 drought linger.

Eastern Region and Northeastern Area--Status of insects in Connecticut, Delaware, Illinois, Indiana, Iowa, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont, West Virginia, and Wisconsin.

Insect	Host	Location	Remarks
Bronze poplar borer *Agrilus liragus*	Aspen, Balsam poplar	Michigan, Minnesota	In Michigan, there is 10-20 percent mortality on poorly drained lowlands in the Upper Peninsula. Minnesota reported 10-30 percent tree mortality on 500 acres associated with gravel deposits and drought.
Browntail moth *Euproctis chrysorrhoea*	Cherry, Oak, Roses, Rubus, Willow	Maine, Massachusetts, New York	The area of infestation continued to spread in southeastern Maine and now covers more than 50 acres. More islands became infested, and there was an increase on the mainland. Severe defoliation was reported on Long Island, New York. Further expansion is expected in 1992. Population levels on Cape Cod in Massachusetts are stable, with light defoliation on 600 acres. Winter nests were clipped on the Cape Cod National Seashore to control the population.
Bruce spanworm *Operophtera bruceata*	Sugar maple	Maine, Vermont	Light defoliation was observed in one area in northern Vermont. Moths were frequently observed throughout the state. In Maine there were no reports of detectable larval populations, although moths were common in some areas last fall.
Buck moth *Hemileuca maia*	Oak	Delaware	Populations have been building for the past few years.
Cherry scallop shell moth *Hydria prunivorata*	Black cherry	Massachusetts, New York, Vermont	Damage was heavy within stands composed of a high percentage of cherry in central and western Massachusetts. The infestation occurred on 6,283 acres, and the population is expected to continue to cause damage in the next year or two. This is the second consecutive year of damage in some areas in northern New York. There was some heavy defoliation in Vermont, where the pest was common in the southern portion of the state.
Conifer swift moth *Korscheltellus gracilis*	Balsam fir, Red spruce	New Hampshire, New York, Vermont	This pest is still considered to be a factor in decline of high-elevation spruce-fir stands.

Insect	Host	Location	Remarks
Eastern larch beetle *Dendroctonus simplex*	Larch	Maine, Vermont	The insect occurred statewide in Maine at monitoring sites. Mortality within stands was approximately 5 percent per year. Incidence in Vermont continued to decline with only a few acres of larch mortality reported this year.
Eastern tent caterpillar *Malacosoma americanum*	Apple, Ash, Black cherry, Maple, Oak, Poplar	Connecticut, Massachusetts, Michigan, Vermont	Nests were very common along roadsides in Connecticut. In Massachusetts, damage has been increasing over the last several years, especially in the eastern portion of the state. In Michigan, low to moderate defoliation occurred on over 2,000,000 acres in the southern Lower Peninsula. Occurrence was widespread throughout northern Vermont, similar to last year's level. However, in southern Vermont, tents were less common.
Elm leaf beetle *Pyrrhalta luteola*	American elm Siberian elm	Missouri, Vermont	The elm leaf beetle has been seen statewide in urban areas in Missouri. Scattered light defoliation was observed in northern Vermont, with isolated damage in southern Vermont.
Elm spanworm *Ennomos subsignarius*	Beech	Pennsylvania	In Pennsylvania, there were 29,800 acres of defoliation, including areas of the Allegheny National Forest.
Elongated hemlock scale *Fiorinia externa*	Eastern hemlock	Connecticut, New York	In Connecticut, the scale was found in association with the hemlock woolly adelgid. There were severe infestations in southeastern New York, increasing in some stands and dying out in areas where hemlock woolly adelgid populations were high.
European pine sawfly *Neodiprion sertifer*	Scotch pine, Red pine	Indiana	There were 200 acres of light defoliation statewide in Indiana.
Evergreen bagworm *Thyridopteryx ephemeraeformis*	Evergreens		No significant activity was reported in 1991.

Eastern Region and Northeastern Area--Status of insects in Connecticut, Delaware, Illinois, Indiana, Iowa, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont, West Virginia, and Wisconsin.

Insect	Host	Location	Results
Fall cankerworm *Alsophila pometaria*	Hardwoods	Massachusetts	There was light defoliation found on Cape Cod, where populations appear to be increasing.
Fall webworm *Hyphantria cunea*	Hickory, Mulberry, Persimmon, Sycamore, Walnut	Massachusetts, Missouri, New Hampshire, New York, Vermont	Populations in Massachusetts were heavy in 1991, especially in areas with a high proportion of black cherry. There were 3,000,000 acres affected statewide in Missouri. Moderate to heavy defoliation occurred in scattered areas in New Hampshire, especially along the seacoast. There were isolated occurrences of complete defoliation in New York. Defoliation was widespread in Vermont, especially along roadsides. Incidence has noticeably increased over 1990, with complete defoliation occurring in some areas.
Forest tent caterpillar *Malacosoma disstria*	Aspen, Basswood, Black cherry, Maple, Oak, Poplar, White birch	Indiana, Maine, Michigan, Minnesota, New York, Vermont, Wisconsin	No defoliation in Indiana this year. Low populations were reported in Maine and Vermont, with only scattered individuals and no defoliation observed. In Michigan, 195,630 acres of defoliation occurred in the Upper Peninsula. This was a decline from 656,000 acres in 1990, and appears to augur the end of an outbreak that began in 1988. Only the extreme eastern Upper Peninsula may sustain defoliation in 1992. In Minnesota, light to moderate defoliation occurred on 1,230,300 acres and heavy defoliation on 415,000 acres. This was the third successive year of some defoliation on over 4,300,000 acres. However, the intensity has declined and is expected to continue to decline in 1992. In New York, over 20,000 acres of moderate to heavy defoliation was reported in the Adirondack region. On over half of the area affected, the trees did not refoliate. Some sugarbush owners applied pesticides to protect maples. Populations are expected to increase in 1992. In Wisconsin, 48,320 acres were defoliated in Marinette and Oconto Counties. This appears to be the end of an outbreak that began in 1986. Defoliation, together with drought, resulted in widespread oak mortality.

1 230 300
415 000
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Insect	Host	Location	Remarks
Gypsy moth *Lymantria dispar*	Hardwoods	Connecticut, Delaware, Illinois, Indiana, Iowa, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont, West Virginia, Wisconsin	Connecticut reported a total of 50,145 acres of defoliation, down from 176,576 acres in 1990. The defoliation occurred predominantly in the western half of the state. The areas of defoliation decreased in New Jersey, Pennsylvania, and Maryland, while increasing dramatically in Delaware. In Illinois, 1,442 moths were trapped, the second largest catch ever recorded. Moth catches continued to increase in northern Indiana counties, and limited ground control efforts took place in Kosciusko County. In Iowa, 60 male moths were trapped from 41 traps in 7 counties. Most were associated with infested ornamental spruce shipped from Pennsylvania. A 10-acre infestation in Scott County will be treated in 1992. Defoliation occurred on more than 600,000 acres in Maine in 1991, increasing from approximately 270,000 acres in 1990. Defoliation was moderate to heavy on about one-third of the defoliated area, and tree mortality was light. The epidemic was reported to be at its peak. The area of defoliation in Massachusetts increased again from approximately 83,000 acres to more than 282,000 acres. Populations continued to build, especially in central and western portions of the state. In Michigan, there were about 625,000 acres of defoliation in the Lower Peninsula. About 250,000 acres were treated with *Bacillus thuringiensis* (B.t.). Populations are expected to continue to increase and spread statewide throughout the oak and aspen types. In Minnesota, 51 male moths were trapped from 31 sites, down from a high of 126 in 1990. In Missouri, statewide trapping continues. Male moths were trapped in several cities; 25 of the 36 moths were caught in St. Louis. Egg masses were found in association with infested ornamental spruce shipped from Pennsylvania. The infestation continued to expand in New Hampshire, causing about 200,000 acres of moderate to heavy defoliation. Population levels will probably be similar next year. New York reported 175,960 acres defoliated, a decrease from 1990 levels of nearly 400,000 acres.

Insect	Host	Location	Remarks
Gypsy moth (Continued)			For the first time in two years, egg masses were found in Rhode Island. There has been no noticeable defoliation in the state since 1988. Populations decreased in Vermont, and area of defoliation decreased from 1990 levels. Only about 1,000 acres in southern Vermont and 2,700 acres in northern Vermont were defoliated. Little defoliation is expected next year. The worst defoliation in West Virginia occurred in Hardy, Grant, and Pendleton Counties. Some population collapse occurred in heavily defoliated areas. In Wisconsin, no detectable defoliation occurred. There were 5,875 acres treated with two aerial applications of B.t. in Door, Kewaunee, and Manitowoc Counties.
Hemlock loopers *Lambdina athasaria* *Lambdina fiscellaria*	Various softwoods	Connecticut, Maine, Massachusetts, New Hampshire, Vermont	In Connecticut, *L. athasaria* caused about 1,500 acres of defoliation, and populations appeared to be increasing. In Maine, the infestation of *L. fiscellaria* expanded to 325,000 acres of moderate to heavy defoliation. About 2,000 acres had greater than 50 percent tree mortality. *L. athasaria* affected 11,500 acres in Maine, with light defoliation. Defoliation by *L. athasaria* occured on 750 acres in Massachusetts and 2,800 acres in New Hampshire. Populations of *L. fiscellaria* in Vermont increased dramatically in 1991. Moths were commonly seen throughout the area, but no defoliation occurred. Damage from *L. athasaria* was found on 1,500 acres in southern Vermont, compared with 10 acres in 1990.

Insect	Host	Location	Remarks
Hemlock woolly adelgid *Adelges tsugae*	Hemlock	Connecticut, Maryland, Massachusetts, New Jersey, New York, Pennsylvania, Rhode Island, Vermont	The state of Connecticut is generally affected. Hemlock stands in previously infested towns have again been found infested. The first occurrences in native hemlock stands were reported in Maryland. In Massachusetts, the infestation appears to be spreading, but is still restricted to the Springfield area. There are unconfirmed reports of the insect in the eastern part of the state. New Jersey reports moderate infestations of native hemlock in 1991. In southeastern New York, moderate to heavy mortality was reported on about 15,000 acres. The infestation is intensifying and spreading, and hemlock mortality is increasing. The hemlock woolly adelgid was reported from five new locations in Pennsylvania. The infestation increased to three of the five counties in Rhode Island, spreading mostly in suburban areas along the coastline. Some areas reported heavy defoliation. The insect was introduced into Vermont in 1990 on tubelings. Eradication continued at the infected site, where several additional seedlings were found infected. No evidence of the pest was found in native hemlock stands in the valley below the infected site.
Introduced pine sawfly *Diprion similis*	Eastern white pine	Minnesota, Wisconsin	There was light defoliation of pines in Cass, Crow Wing, and Morrison Counties in Minnesota. In Wisconsin, there were 10,000 acres of moderate and 5,000 acres of heavy defoliation of open-grown white pine in Sawyer County.
Jack pine budworm *Choristoneura pinus pinus*	Jack pine	Michigan, Minnesota	There were 500 acres defoliated in Pine, Beltrami, and Hubbard Counties in Minnesota. In Michigan's Upper Peninsula, almost 48,000 acres were defoliated, while 475,000 acres were defoliated in the northern Lower Peninsula. Populations are expected to stabilize or decrease.
Jack pine sawfly *Neodiprion pratti banksianae*	Jack pine	Minnesota	There were 7,000 acres defoliated in Koochiching County, with scattered defoliation throughout northern Minnesota.

Insect	Host	Location	Remarks
Larch sawfly *Pristiphora erichsonii*	Eastern larch	Region/Areawide	No significant activity was reported in 1991.
Lecanium scale *Lecanium* sp.	Black locust, Maple, Oak	Vermont	A small number of insects were detected in the area of Grand Isle in northern Vermont.
Locust leafminer *Odontota dorsalis*	Locust		No significant activity was reported in 1991.
Looper complex	Maple, Oak	Indiana, Maryland, West Virginia	The complex appears to consist of the linden looper, fall cankerworm, and half-wing geometer. Populations decreased in Indiana in 1991, while 2,000 acres of defoliation were reported in Maryland. Ohio, and Morgan Counties in West Virginia exhibited light defoliation.
Maple leafcutter *Paraclemensia acerifoliella*	Sugar Maple	New York, Vermont	About 10,000 acres were defoliated in northern New York. About 3,000 acres of defoliation were observed in southern Vermont. Lighter damage could be found throughout the region, especially on regeneration. Damage was also found on 2,036 acres in northern Vermont and populations are increasing.
Maple leafroller *Sparganothis acerivorana*	Red maple	Maine	Ground and aerial observations revealed no visible damage from this insect in 1991.
Maple trumpet skeletonizer *Epinotia aceriella*	Red maple, Sugar maple	New York, Vermont	Defoliation occurred in several counties in northern New York, an increase from last year. Damage in Vermont was scattered and variable throughout the state. Areas of greatest activity were Windsor and Addison Counties.
Nantucket pine tip moth *Rhyacionia frustrana*	Pines	Massachusetts	Damage was heavy to pitch pine throughout the Cape Cod area, affecting 10,000 acres. Heavy infestation is expected to continue in 1992.
Oak leaftier *Croesia semipurpurana*	Red oak	Maine, Vermont	Population levels were low in Maine, with no reportable defoliation. Conditions are expected to remain the same in 1992. In Vermont, very few moths were collected in pheromone traps, except in Rochester, where numbers increased substantially from last year. No damage was reported anywhere in the state.

Insect	Host	Location	Remarks
Oak skeletonizer *Bucculatrix* sp.	Shingle oak	Missouri	Heavy leaf skeletonizing was found statewide. The last outbreak was in 1983, with the next outbreak predicted in 1999.
Orangestriped oakworm *Anisota senatoria*	Various oaks	Michigan	There was heavy defoliation of 3,500 acres in Montcalm and Ionia Counties in the Lower Peninsula.
Oystershell scale *Lepidosaphes ulmi*	Beech, Maple	New York, Vermont	Twig damage was reported on 5,000 acres in northern New York. Hamilton, Lewis, and Fulton Counties were affected. In Vermont, the scale was present on beech regeneration. Populations increased from 1990, but remain lower than the high levels in 1988. Little damage was detected, but beech dieback, which was associated with past infestations, remains noticeable.
Pales weevil *Hylobius pales*	Red pine, Scotch pine	Vermont	Light to moderate damage was reported on 134 acres of Chistmas trees in northern Vermont. Damage levels remain about the same as the previous two years. No observations were made in the southern part of the state.
Pear thrips *Taeniothrips inconsequens*	Apple, Sugar maple	Iowa, Maine, Maryland, Michigan, Minnesota, Pennsylvania, Rhode Island, Vermont, Wisconsin	Population levels continued to be low in central and southern Maine, with some light damage observed. An area of 29,000 acres was surveyed for the pest. Populations were very low throughout Maryland and Pennsylvania. First report of pear thrips in Minnesota was found in Hennepin and Carver Counties. It was also found in Wisconsin, Michigan, and Iowa in 1991. Some light damage was reported on survey plots in Rhode Island. Damage in Vermont declined in 1991 and was reported light throughout the state. No defoliation was aerially mapped. Overwintering soil counts were reduced about 90 percent from the previous year, and bud counts were also reported lower than 1990. Spring weather conditions, which promoted rapid leaf expansion, contributed to lower damage levels. Dieback continued in one southern Vermont maple stand that was severely defoliated in 1988 and 1989 and also stressed by drought conditions.

Insect	Host	Location	Remarks
Pine engraver beetle *Ips pini*	Jack pine, Red pine	Michigan	Tree mortality occurred in scattered pockets on 433 acres in Baraga County of the Upper Peninsula. Timber salvage is expected in 1992.
Pine false webworm *Acantholyda erythrocephala*	Pines	New York	The infestation in New York has been increasing for 10 years and continued this trend. Seventy percent defoliation occurred on over 6,600 acres in 1991. Damage is expected to continue, and another 5,500 acres of pine are reported at risk of severe defoliation.
Pine needleminer *Exoteleia pinifoliella*	Pitch pine Hard pine	Massachusetts	Heavy defoliation occurred on 4,000 acres in Plymouth County. The population appears to be increasing.
Pine root collar weevil *Hylobius radicis*	Scotch pine	West Virginia	There was heavy damage in Morgan County, primarily on Christmas tree plantations. The insect was also found in Lincoln, Wood, Berkley, Marion, Morgan, and Mason Counties.
Pitch pine looper *Lambdina athasaria* *Lambdina pellucidaria*	Pitch pine	Massachusetts, New Jersey, New York	This is the first year of noticeable defoliation by *L. pellucidaria* in Massachusetts since the mid 1970s. About 500 acres were defoliated, and the infestation is expected to increase. Approximately 200,000 acres were defoliated by *L. athasaria* in the Pine Barrens in New Jersey. Some tree mortality may occur. *L. pellucidaria* caused moderate to heavy damage on about 600 acres on Long Island in New York.
Redheaded jackpine sawfly *Neodiprion rugifrons*	Jack pine	Wisconsin	There were 5,000 acres defoliated in Wisconsin and heavy mortality is expected in 1992.
Red pine adelgid *Pineus borneri*	Red pine	Connecticut, Massachusetts, New York, Rhode Island	Static levels were reported in 1991 in these states.

Eastern Region and Northeastern Area--Status of insects in Connecticut, Delaware, Illinois, Indiana, Iowa, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont, West Virginia, and Wisconsin.

Insect	Host	Location	Remarks
Red pine scale *Matsucoccus resinosae*	Red pine	Connecticut, New York, Rhode Island	After several years of minimal activity, the insect increased in 1991, and threatens to damage 1,000 acres of red pine in southeastern Connecticut. Populations are reported to be stable in southeastern New York, and have stopped spreading. Reduced numbers of host trees are cited as the reason for the decline. Heavy defoliation and mortality continued in southern Rhode Island and are expected to spread throughout the range of red pine within the state.
Saddled prominent *Heterocampa guttivitta*	Sugar maple, Other hardwoods	Maine, Massachusetts, Vermont	No defoliation was reported in northern hardwood stands across central and southern Maine. Populations are stable at low levels and are not expected to change in the near future. Numbers of moths caught in pheromone traps were minimal. Infestation was reported to be heavy on 2,000 acres in Berkshire County in western Massachusetts. Presence of a disease in the population was indicated. In Vermont, populations declined, and no defoliation was aerially mapped. Larvae were occasionally observed, and small numbers of moths were caught in light and pheromone traps. A fungal pathogen was suspected to have caused the decline.
Slug oak sawfly *Caliroa quercuscoccineae*	Oaks	Indiana	There were 500 to 1,000 acres of light defoliation in Pike County. This was the first report of defoliation within the state.
Southern pine beetle *Dendroctonus frontalis*	Loblolly pine	Maryland	There were 15 acres of new infestation in Worcester County.
Spearmarked black moth *Rheumaptera hastata*	Birch	Maine	No significant activity reported in 1991.
Spring cankerworm *Paleacrita vernata*	Scotch pine	Delaware	There were 5,000 acres with varying degrees of defoliation in Sussex County.

Insect	Host	Location	Remarks
Spruce beetle *Dendroctonus rufipennis*	Black spruce, Red spruce, White spruce	Maine, New York	Heavy infestation continued on almost 9,000 acres in northern and western areas of Maine. Mortality in spruce was over 25 percent. Scattered damage was identified on over 1,000,000 acres. The attack appears to have peaked in 1990 and 1991 in much of this area, and is expected to be stable. A new damage area of about 100 acres was discovered in 1991 on several islands off the southeast coast, and possible expansion may occur in that area. New York reports an infestation on over 8,000 acres in Hamilton and Fulton Counties. Mortality was moderate on 3,000 acres and heavy on 1,500 acres.
Spruce budworm *Choristoneura fumiferana*	Balsam fir, Red spruce, White spruce	Maine, Minnesota, New York, Vermont	Populations in Maine have steadily declined to the present endemic conditions, and are expected to remain there. Some minor tree mortality due to secondary causes continued in Hancock County, which was the last area of outbreak. Defoliation occurred on 108,000 acres primarily in Cook County, and scattered throughout north and northeastern Minnesota. In New York, light populations were reported in Lewis, Jefferson, St. Lawrence, and Oneida Counties, showing an increase over past years. A high number of moths were caught in a pheromone trap in Essex County. Levels in Vermont continued to be, low with no defoliation or larvae observed. There was an increase in moths caught in pheromone traps, which may be signaling the onset of another outbreak.
Twig beetle *Pityophthorus* sp.	White pine	Rhode Island	No significant activity was reported in 1991.
Two-lined chestnut borer *Agrilus bilineatus*	Oaks	Minnesota, Wisconsin	No significant activity was reported in 1991.
Variable oakleaf caterpillar *Heterocampa manteo*	Beech	Maine	Across central and eastern Maine, 250,000 acres were damaged. Most of the feeding was light, except on individual trees, where damage was occasionally heavy.

Eastern Region and Northeastern Area--Status of insects in Connecticut, Delaware, Illinois, Indiana, Iowa, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont, West Virginia, and Wisconsin.

Insect	Host	Location	Remarks
Virginia pine sawfly *Neodiprion pratti*	Shortleaf pine, White pine	Regionwide	No significant activity was reported in 1991.
Walnut caterpillar *Datana integerrima*	Walnut	Regionwide	No significant activity was reported in 1991.
White pine weevil *Pissodes strobi*	Blue spruce, Jack pine, Norway spruce, Red spruce, Scotch pine, White pine, White spruce	Maine, Vermont	Statewide damage continued to occur in Maine, with 418,900 acres affected. Damage frequently reduces affected trees from sawlog quality to pulpwood. Levels are expected to remain high, but stable. No heavy damage was observed in Vermont. Levels were similar to 1990, occurring on 171 acres of Christmas trees in the northern part of the state and throughout southern areas.
Willow leaf beetle *Chrysomela* sp.	Willow	Minnesota	Trees were affected throughout the Twin Cities Metro Area of Minnesota.
Yellowheaded spruce sawfly *Pikonema alaskensis*	Spruce	Michigan, Vermont	In Michigan, defoliation was scattered throughout the Upper Peninsula. Many Christmas tree growers reported damage. Populations in Vermount decreased from 1990, occurring only on ornamentals in the locality of Montpelier.

Eastern Region and Northeastern Area--Status of insects in Connecticut, Delaware, Illinois, Indiana, Iowa, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont, West Virginia, and Wisconsin.

Eastern Region / Northeastern Area Diseases

Prepared by S. Cox, M. Miller-Weeks, M. Mielke, F. Peterson, and D. Twardus

Disease	Host	Location	Remarks
Stem and Branch Diseases			
Beech bark disease *Nectria coccinea* var. *faginata* in association with **Beech scale** *Cryptococcus fagisuga*	American beech	New England, New York, Pennsylvania, West Virginia	Populations of the scale and fungus seemed to be down in Maine, although heavy mortality and dieback occurred from the disease, complicated by a severe May freeze. Scattered dieback and clorosis occurred in southern Vermont with an increase in Nectria fruiting. The Northeast Kingdom of Vermont had a decrease of occurrence, and the Champlain Valley had a slight increase of the disease. A decrease of the scale was detected in New York with 4,000 acres showing heavy infection (70-100 percent). Infection levels were static in Connecticut. The disease also continued to cause dieback and mortality throughout the other New England states. The disease was widespread in northern Pennsylvania counties. In West Virginia, the presence of the disease continued to be reported on the Monongahela National Forest, though expansion in 1991 may have been limited by dry weather.
Butternut canker *Sirrococcus clavigignenta-juglandacearum*	Butternut	Vermont, Wisconsin	The canker was widespread throughout Vermont, with new infections detected in Orange, Lamoille, and Chittenden Counties in northern Vermont. More than 50 percent mortality occurred in one stand first found infected in 1986. More intensive surveys will be conducted in the future. There were 28 counties infested in Wisconsin.
Caliciopsis canker *Caliciopsis pinea*	White pine	Maine, Vermont	The disease occurred throughout Vermont, and on one site in Maine in association with overstocked or off-site trees.
Comandra blister rust *Cronartium comandrae*	Shortleaf pine	Missouri	Comandra rust was present in only five plantations on the Mark Twain National Forest.

Eastern Region and Northeastern Area--Status of diseases in Connecticut, Delaware, Illinois, Indiana, Iowa, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont, West Virginia, and Wisconsin.

Disease	Host	Location	Remarks
Cytospora canker *Valsa kunzei* (=Cytospora kunzei)	Blue spruce, Norway spruce, Red spruce	Vermont, West Virginia	This disease is common on ornamentals throughout the state.
Diplodia blight *Sphaeropsis sapinea* (=*Diplodia pinea*)	Austrian pine, Mugo pine, Red pine, Scotch pine	Indiana, Maine, Pennsylvania, Vermont, West Virginia, Wisconsin	Diplodia was found primarily on Christmas trees in Indiana. Moderate to severe damage occurred on a site in mid-coastal Maine. There was some incidence reported in the Pennsylvania Bureau of Forestry seedling nurseries. Damage was present throughout Addison County, Vermont, and on at least one site in southern Vermont. Occurrence was primarily on Christmas trees in West Virginia. In Wisconsin, 1,255 acres of two- to seven-year-old plantations were infected, with less than 10 percent mortality on 673 acres and greater than 10 percent mortality on 582 acres.
European larch canker *Lachnellula willkommii*	Eastern larch	Maine	No increases were reported in 1991. The area affected was approximately 6,500 acres and remains relatively unchanged. Infection was heavy at two coastal epicenters, and light to moderate elsewhere. No major increases are expected in the future. The quarantine was reviewed and remains in effect.
Hypoxylon canker *Hypoxylon atropunctatum*	Aspen, Oaks	Vermont	Occurrence of Hypoxylon remains common in Vermont.
Scleroderris canker *Ascocalyx abietina* (=*Gremmeniella abietina*)	Jack pine, Red pine, Scotch pine	Maine, Michigan, Vermont	Static infestation levels were reported in Maine at two isolated spots. In Michigan, 240 infested acres were detected in the Upper Peninsula. There has been no significant mortality for 14 years. The disease was not found in any new locations for the fifth consecutive year in Vermont; the quarantine is still in effect. About 992 acres were infected in the northern part of the state.
White pine blister rust *Cronartium ribicola*	White pine	Indiana, Maine, Vermont, West Virginia	The trend of the disease was static in Maine, and it occurred statewide. Annual losses were again estimated at $100,000. Significant mortality and top dieback occurred in a sawlog-sized stand, and caused heavy damage in young plantations in southern Vermont. An estimated 10 acres were affected in Marshall and Fulton Counties in Indiana. Active blister rust cankers were found in 10 of the 52 grid points surveyed in West Virginia.

Eastern Region and Northeastern Area--Status of diseases in Connecticut, Delaware, Illinois, Indiana, Iowa, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont, West Virginia, and Wisconsin.

Disease	Host	Location	Remarks
Root Diseases			
Annosus root and butt rot *Heterobasidion annosum*	Red pine, White pine, Norway spruce	Maine	Trace to light infections were present in red pine plantations. The trend was expected to gradually increase.
Armillaria root rot *Armillaria* spp.	Red oak, Northern oak, Pin oak, Scarlet oak, Red pine	Iowa, Michigan, Minnesota, Wisconsin	Mortality was scattered over 500,000 acres related to regional drought in previous years.
Foliage Diseases			
Anthracnose *Gloeosporium spp.* *Discula spp.* *Apiognomonia veneta* *Gnomonia spp.*	Maple, Sycamore, Other Hardwoods	Maine, Vermont	Light damage was observed in Vermont and Maine, down dramatically from 1990.
Ash rust *Puccinia sparganioides*	Ash	Delaware	No significant activity was reported in 1991.
Dogwood anthracnose *Discula* sp.	Dogwood	Connecticut, Massachussetts, New Hampshire, New York, Pennsylvania, West Virginia	The disease was present throughout Connecticut and Maryland. Infections occurred in eastern Massachussetts and southeastern New Hampshire. The disease was identified infecting dogwood throughout Long Island and all along the southern tier of counties in New York. It was also present in Monroe County, West Virginia, which is along Lake Ontario. The disease was present in most counties in Pennsylvania. All 55 counties in West Virginia had dogwood anthracnose reported.
Oak leaf scorch *Xylemella fastidiosum*	Red oaks	Delaware	There were 500 acres affected statewide. Some tree mortality occurred in residential areas.

Disease	Host	Location	Remarks
Vascular Wilts and Declines			
Ash yellows (Ash dieback)	Black ash, Blue ash, Brown ash, Green ash, White ash	Indiana, Iowa, Maine, New York, Pennsylvania, Vermont	Ash decline/yellows is epidemic in northeastern Indiana and can be found throughout the northern half of the state. Annual mortality was estimated at 3 percent of the ash population. The disease increased in urban trees in Iowa in 1991. Maine reported 2,000 acres affected in Aroostook County, particularly along streams and wet areas; this was a slight increase from 1990. Approximately 750 acres were severely affected (70-100 percent of trees symptomatic or dead), and it appeared to be something other than ash yellows. The trend is expected to increase. Ash yellows continued to be associated with ash dieback in New York. There were nine counties in Pennsylvania that reported symptoms - Lehigh, Adams, Cumberland, Mifflin, Clarion, Erie, Perry, Junita, and Clinton. In Vermont, dieback remained common and stable, especially in the Champlain Valley area and other low-evevation sites with a high stocking of pole-size trees.
Birch dieback	White birch, Yellow birch	Maine, Vermont	Dieback continued in Maine, affecting 34,300 acres in the Rangeley region and 49,400 acres in Washington County. Defoliation was light throughout the area. In an annual plot survey, 59-66 percent of the white birch exhibited top dieback and 3-9 percent died. Tree health as reflected by crown condition improved from 1990. In northern Vermont, trees appeared to be recovering, but scattered mortality was still occurring. Widespread birch defoliation and dry summer weather is expected to cause dieback in southern Vermont in the future.
Dutch elm disease *Ceratocystis ulmi*	American elm	Areawide	The disease remains common throughout the region, with the more virulent strain causing mortality in previously unaffected trees. It is considered to be the most important forest and shade problem in several states.

Disease	Host	Location	Remarks
Larch decline	Eastern larch	Maine, Vermont	Mortality was still common throughout most of Maine. Up to 100 percent mortality occurred in some stands infested with the eastern larch beetle (*Dendroctonus simplex*). New attacks were most common in previously infected stands. However, new localized outbreaks occurred in eastern counties. Only 19 acres of mortality were detected in Vermont.
Maple decline	Red maple, Sugar maple	Maine, Michigan, Pennsylvania, Vermont	Maple stands continued to be monitored throughout the Region. Symptoms remained static in western Maine, with less than 10 percent crown dieback. In the Upper Peninsula of Michigan, dieback and mortality occurred on sites with poor drainage, heavy or shallow soils, and subjected to forest tent caterpillar defoliation during the droughts of 1987-1989. Some reports of damage in Pennsylvania may possibly be associated with pear thrip activity. In northern Vermont, 3,328 acres of decline and mortality were observed in scattered locations. In general, trees looked healthier than in previous years due to vigorous spring flush. Dry summer conditions may lead to some decline next year.
Oak decline	Oak species	Iowa, Michigan, Minnesota, Missouri, Wisconsin	There were 750,000 acres of scattered mortality caused by attacks of the two-lined chestnut borer and armillaria root disease, predisposed by the droughts of 1987-1989.
Oak wilt *Ceratocystis fagacearum*	Red oak group	Indiana, Iowa, Michigan, Minnesota, Pennsylvania, West Virginia, Wisconsin	The disease was present throughout Indiana but most noticeable in the northwestern part of the state. In Iowa, one- to two-acre centers are scattered over 10,000 acres. There were 236 centers affected in the Upper Peninsula and 300 acres in the Lower Peninsula of Michigan. In Minnesota, there were 3,000 centers in the 10-county metro-region affected. Oak wilt is present, but rare, in Pennsylvania. No aerial survey was conducted in West Virginia in 1991. There were 50 counties infected in Wisconsin.

Disease	Host	Location	Remarks
Pine wood nematode *Bursaphelenchus xylophilus*	Austria pine, Balsam fir, Black pine, Jack pine, Japanese pine, Scotch pine, White pine	Iowa, Maine, Missouri, New York	Plantations, windbreaks, and ornamental plantings throughout Iowa and Missouri were infected. Trees in nine Maine counties have been found infested but the potential hazard is minimal. Jack pine trees on Long Island, New York, have been infested. The species is being eliminated in some parks and ornamental plantings through cutting and disposal.
Sapstreak *Ceratocystis coerulescens*	Sugar maple	New York	Some sugarbushes in the northern part of the state continued to be affected.
Spruce-fir decline	Balsam fir, Red spruce	New Hampshire, New York, Vermont	High-elevation permanent plots continued to be monitored for spruce mortality. No increase in occurrence was reported.
Verticillium wilt *Verticillium albo-atrum*	Norway maple, Sugar maple	Iowa	Incidence of the disease increased in 12 urban areas surveyed.
Abiotic Damage			
Drought	Conifers, Hardwoods	Delaware, Indiana, Iowa, Minnesota, New York, Vermont, West Virginia	Residential and rural oaks were affected in Delaware. Light mortality was reported in Indiana. The species most affected were yellow poplar, sugar maple, white pine and black cherry. Drought affected jack, red, and white pine in Iowa. There were 220 acres of tree mortality in one- or two-acre pockets in plantations. This mortality was related to lingering effects of 1987, 1988, and 1989 droughts. Scattered mortality occurred to balsam fir and paper birch in Itasca, Koochiching, and St. Louis Counties in Minnesota. Lake and Carlton Counties also had scattered birch mortality. Drought has also affected forests in central and western New York. In Vermont, drought conditions in June and July led to leaf scorch, chlorosis, leaf curling, and dropped leaves on hardwoods. Symptoms are expected to show for the next couple of years. In West Virginia, drought conditions were the worst in northern counties.

Disease	Host	Location	Remarks
Flooding	Cottonwood, Bottomland hardwoods	Iowa	435 acres were flooded in central and eastern Iowa.
Frost Damage	Conifers	Maine, Vermont	About one million acres were affected in northwestern Maine. Especially hard-hit was fir reproduction. Oak and beech were also affected. Late spring frost killed scattered new growth on balsam fir, other Christmas tree species, and sensitive hardwoods in northern Vermont.
Hurricane Bob	Conifers, Hardwoods	Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island	Coastal areas were hard-hit with salt spray damage, conifers being most susceptible. Forest trees and ornamentals were broken or blown down in areas throughout the coastal New England region. Cape Cod, Massachusetts, was the hardest-hit, with pockets of severe damage occurring throughout the area. Black locust, pines, older oaks, street trees, and other stressed trees were most susceptible to being uprooted and broken. Remnants of the damage are expected to remain for years. Many trees were permanently tilted in certain larch plantations in Maine.
Ice storm Damage	Conifers, Hardwoods	Indiana, New York, Wisconsin	In Indiana, 100,000 acres of jack pine in forest, fence row, and yard trees in 13 counties were damaged. Damage included uprooted and broken limbs and tops. Up to an inch of ice damaged trees in western and central New York. Monroe County reported the most damage, with 30 percent of the trees severely broken and another 30-50 percent moderately damaged. Species most affected were ash, soft maples, pine, larch, and willow, as well as other stressed or weakened trees. The storm also caused limbs to droop in the summer and internal injuries, which may take more time to detect. Salvage of timber and pruning, removal, and planting of ornamental trees is being done. Over three million cubic yards of debris were cleared from Monroe County. A severe storm in March, 1991 snapped trees on over 4,300 acres in Wisconsin.

Disease	Host	Location	Remarks
Ozone injury	Conifers, Hardwoods, White pine	Michigan, New Hampshire, Vermont	Twenty percent of the trees in a 25-acre plantation in Montgomery County, Michigan, were affected. Ozone symptom surveys continued to be conducted in wilderness areas on the White and Green Mountain National Forests. Evaluations showed light damage occurred on sensitive native plants.
Semi-mature tissue needle blight	White pine	Indiana	Forty acres of white pine Christmas trees were affected in Harrison and Clark Counties.
Wind injury	Aspen	Wisconsin	In Wisconsin, 21,525 acres in Chippewa, Lincoln, Langlade, and Oneida Counties were damaged by a storm on May 29. There were 71,000 acres in Rusk, Barron, Chippewa, and Price Counties affected by another storm on June 7.
Winter injury	Conifers	Vermont	Light to moderate injury occurred on Christmas trees, mostly Scotch pine, in nothern Vermont. Winter injury also caused mortality on plantings of arborvitae and hemlock, and winter browning on white pine.
Other Damage			
Stillwell's syndrome	Balsam fir	Maine	Scattered, low numbers of afflicted fir were noted over 7,000,000 acres of spruce-fir forest type. No significant concentrations of the syndrome were detected and tree mortality was minimal. The occurrence has stabilized or declined in most of Maine, except Hancock County, where the attack was most recent and is expected to fluctuate for several more years. Armillaria root disease is associated with the syndrome. The general trend is expected to remain at low levels unless a new stress factor, such as a spruce budworm outbreak, occurs.

Eastern Region and Northeastern Area--Status of diseases in Connecticut, Delaware, Illinois, Indiana, Iowa, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont, West Virginia, and Wisconsin.

Alaska Region Insects

Prepared by Edward H. Holsten

Insect	Host	Location	Remarks
A birch borer *Synanthedon culiciformis*	Paper birch	Southcentral and Interior Alaska	Clear-wing moth damage to ornamental birch was widespread throughout the Anchorage bowl. This insect was first described from Alaska in the late 1800s. Since then no specimens or damage have been observed until 1989. Damage (phloem consumption) results in weakened trees that are susceptible to pathogen entry and subsequent wind breakage.
Alder "scorch"	Alder	Southcentral Alaska	No significant activity was reported in 1991.
Birch Defoliation Noctuidae	Birch	Southcentral Alaska	A few hundred acres of birch were heavily defoliated on Ft. Richardson military land near Anchorage. The causal agent was a noctuid caterpillar. Final identification is pending.
Birch leafroller *Epinotia solandriana*	Birch	Southcentral Alaska	No significant activity was reported in 1991.
Bud moth *Zeiraphera* sp.	Sitka spruce	Southeast Alaska	No significant activity was reported in 1991.
Cone and seed insects *Cydia youngana* *Dasineura rachiphaga* *Hylemia* sp.	White spruce	Interior and Southcentral Alaska	No significant activity was reported in 1991.
Cottonwood defoliators *Chrysomela* sp. *Lyonetia* sp.	Black cottonwood	Prince William Sound, Interior, and Southeast Alaska	Leaf beetles and blotch-miners defoliated approximately 14,000 acres of cottonwood in the Interior and Prince William Sound areas; the majority of the damage occurred in Interior Alaska mostly near Holy Cross. The remaining 5,448 acres occurred near Cape Yakataga in Prince William Sound. Leaf beetles defoliated approximately 1,500 acres of cottonwood and willow along the Dangerous River near Yakutat. Cottonwood defoliation in Southeast Alaska totalling 3,500 acres was noted primarily along the Antler, Stikine, Taku, and Unuk Rivers.

Alaska Region--Status of insects in Alaska.

Insect	Host	Location	Remarks
Engraver beetle *Ips perturbatus*	White spruce	Interior Alaska	*Ips* populations increased in 1991 in Interior Alaska and now infest approximately 5,800 acres, the majority of which occur along the shores of the Noatak River. Much of the Yukon River spruce beetle infestation reported in recent years was actually caused by engraver beetles. Increased engraver-caused spruce mortality is expected near Fairbanks next year, a direct result of engraver beetle populations increasing in broken tops in early spring of 1990.
Giant conifer aphid *Cinara* sp.	Sitka spruce	Southcentral Alaska	No significant activity was reported in 1991.
Gypsy moth *Lymantria dispar*		Southcentral Alaska	Ground checks and pheromone trapping did not detect the presence of any gypsy moths.
Hemlock sawfly *Neodiprion tsugae*	Western hemlock	Southeast Alaska	Sawflies caused light defoliation of approximately 900 acres of hemlock near Camp Cove on western Dall Island.
Large aspen tortrix *Choristoneura conflictana*	Quaking aspen	Southcentral and Interior Alaska	Tortrix populations decreased throughout Alaska's quaking aspen stands. Only 4,120 acres of defolated aspen were detected this year versus 63,234 acres in 1990. The majority of the 1991 damage occurred on the Kenai Peninsula.
Sitka spruce looper Geometridae (*Melanolophia initata*)	Sitka spruce	Southcentral Alaska	No significant activity was reported in 1991.
Spearmarked black moth *Rheumaptera hastata*	Paper birch	Southcentral and Interior Alaska	Black moth populations increased slightly in 1991; approximately 4,223 acres were defoliated in Interior Alaska. The 13,000 acres of suspected black-moth damage on the Kenai Peninsula observed last year were not apparent during the 1991 aerial surveys.

Alaska Region--Status of insects in Alaska.

Insect	Host	Location	Remarks
Spruce beetle *Dendroctonus rufipennis*	Lutz spruce, Sitka spruce, White spruce	Throughout Alaska	In 1991, active infestations covered 375,000 acres, approximately 150,000 acres more than in 1990. Increased activity occurred in the Copper River area near Chitina, the Clam Gulch-Tustumena Lake area on the Kenai Peninsula, and portions of the west side of Cook Inlet near the Skwentna River. The Yukon River outbreak appears to be static-to-declining. Outbreaks in Southeast Alaska Sitka spruce, within Glacier Bay National Park and near Haines, Alaska, continued to expand and totalled approximately 15,000 acres.
Spruce bud midge *Dasineura swainei*	Black spruce, White spruce	Southcentral Alaska	Bud midge damage is prevalent on open grown regeneration throughout the Kenai Peninsula. In many cases, multiple leaders result.
Spruce budworm *Choristoneura* sp.	Sitka spruce, White spruce	Interior and and Southeast Alaska	Budworm populations increased in interior Alaska's white spruce stands near Fairbanks and Delta Junction, where more than 20,000 acres of mature white spruce were defoliated (the heaviest budworm defoliation ever seen in interior Alaska). In Southeast Alaska, defoliation of Sitka spruce along the Ferebee and Kelsall Rivers totalled approximately 5,000 acres.
Striped alder sawfly *Hemichroa crocea*	Alder	Southcentral and Southeast Alaska	Riparian zone alder in a few areas in Southcentral Alaska were defoliated by large populations of the striped alder sawfly, a pest more commonly encountered in coastal Southeast Alaska. In Southeast Alaska, sawflies defoliated approximately 300 acres of alder along the Stikine River. Defoliation presumably slows the growth rate of affected shrubs, but no impact data are available.
Western black-headed budworm *Acleris gloverana*	Sitka spruce, Western hemlock	Prince William Sound and Southeast Alaska	Budworm populations in Prince William Sound declined in 1991; aerial surveys detected only 7,000 acres of defoliated hemlock and spruce vs. 40,000 acres in 1990. Areas most seriously impacted include 4,126 acres along the coast between Tatitlek and Cordova. Most of the budworm activity has been limited to forested areas along the shoreline. Approximately 6,000 acres of light hemlock defoliation occurred in Southeast Alaska, primarily north of Frederick Sound.

Alaska Region--Status of insects in Alaska.

Insect	Host	Location	Remarks
Willow defoliation Tortricidae Chrysomelidae	Willow	Southcentral and Interior Alaska	1991 aerial surveys detected approximately 130,000 acres of heavily defoliated willow, four times the amount detected in 1990. Assorted leaf miners, noctuids, rusty tussock moth, and leaf beetle larvae were responsible for the majority of the defoliation, which was a result of three consecutive warm, dry springs and summers throughout Interior Alaska.

Alaska Region--Status of insects in Alaska.

Alaska Region Diseases

Prepared by Paul E. Hennon

Disease	Host	Location	Remarks
Stem and Branch Diseases			
Hemlock dwarf mistletoe *Arceuthobium tsugense*	Western hemlock	Southeast Alaska	Common to abundant in old-growth western hemlock throughout Southeast Alaska from Dixon Inlet to the Haines area. Absent to the northwest within the remaining range of host type. The disease caused stem deformity, growth loss, and mortality. Incidence and impact in managed young-growth stands are associated with the presence of large infected residuals from the original stand.
Spruce broom rust *Chrysomyxa arctostaphyli*	Black spruce, Lutz spruce, Sitka spruce, White spruce	Interior and Southcentral Alaska	Perennial infections were common on spruce wherever spruce grows with the alternate host kinnikinnik. Caused witches brooms and an undetermined growth loss on spruce. Witches brooms are important hiding and nesting habitat for wildlife.
Stem cankers *Encoelia pruinosa* *Ceratocystis fimbriata* *Cryptosphaeria populina* *Cytospora chrysosperma*	Hardwoods	Throughout Alaska	Stem-infecting fungi caused an undetermined level of mortality. On surviving trees, open wounds caused by these fungi allow wood decay fungi to enter and initiate heartrot. Canker fungi were particularly damaging to aspen, birch, and mountain ash.
Stem decays Many Basidiomycetes	All tree species	Throughout Alaska	Stem decay fungi caused a large, but unquantified loss of wood volume throughout Alaska. Loss was considerable in unmanaged, old-growth stands and may become serious in spruce and hemlock wounded during thinning activities in managed stands in Southeast Alaska. By predisposing trees to stem breakage and mortality, decay fungi are important factors in gap-formation and the dynamics of coastal old-growth forests.
Western gall rust *Endocronartium harknessii*	Shore pine	Southeast Alaska	Abundant throughout the range of pine in Alaska every year. Health effects on pine are typically negligible unless a secondary infection occurs (by the fungus *Nectria macrospora*), which results in branch or bole death.

Alaska Region--Status of diseases in Alaska.

Disease	Host	Location	Remarks
Root Diseases			
Armillaria root rot *Armillaria* spp.	All tree species	Throughout Alaska	Only occasionally was the primary cause of tree mortality; typically occurred as a secondary invader of previously stressed trees.
Pholiota and Coniophora butt rots *Pholiota alnicola* *Coniophora puteana*	Lutz spruce, White spruce	Southcentral and Interior Alaska	Common cause of root and butt rots that reduce volume and create hazardous trees.
Schweinitzii butt rot *Phaeolus schweinitzii*	Lutz spruce, Sitka spruce, White spruce	Southeast and Southcentral Alaska	Decay in roots and butts of large trees caused loss of wood volume and created hazardous trees in recreation and urban areas.
Tomentosus root rot *Inonotus tomentosus*	Lutz spruce, White spruce	Southcentral and Interior Alaska	Caused butt rot in spruce. Also colonized live roots and may predispose spruce to attack by bark beetles.
Foliage Diseases			
Shoot blight *Aprostrasseria* sp.	Yellow-cedar	Southeast Alaska	Common and damaging on cedar seedlings and saplings, where terminal and lateral shoots were frequently killed. Incidence appears to remain constant year-to-year. Damage is greatest to planted seedlings on sites with endemic cedar nearby.
Spruce needle cast *Lirula macrospora*	Sitka spruce	Coastal Alaska	Common in young-growth stands and on ornamental trees throughout the range of Sitka spruce.
Spruce needle rust *Chrysomyxa ledicola*	Lutz spruce, Sitka spruce, White spruce	Southwest, Southcentral, and Southeast Alaska	Spruce needle rust is abundant on Lutz spruce from Seward to Anchor Point on the Kenai Peninsula. Heavy needle rust was also observed in the Juneau and Dillingham areas. Although infected trees appear unsightly, little damage usually occurs unless the tree is infected for several consecutive years.
Venturia leaf blight *Venturia populina*	Quaking aspen	Southcentral Alaska	Leaf blight was detected on thousands of acres of quaking aspen; in most cases, only branch tips were killed.

Alaska Region--Status of diseases in Alaska.

Disease	Host	Location	Remarks
Vascular Wilts and Declines			
Yellow-cedar decline	Yellow-cedar	Southeast Alaska	Decline persists as one of the most significant forest problems in Alaska. Over 525,000 acres of unmanaged stands on moderately and poorly drained sites have dying, recently killed, and long-dead cedar trees. Concentrated mortality is distributed along a wide band from northwest Chichagof Island to the Ketchikan area. This year's mortality was most severe around southern Wrangell and Chichagof Islands. Research indicates that no biotic agent is the primary cause of decline.
Other Damage			
Brown bear *Ursus arctos*	Yellow-cedar	Southeast Alaska	Over 50 percent of cedar trees in many stands on Baranof and Chichagof Islands have old or recent scars caused by brown bears. Bears wound cedar in spring, apparently to feed on the cambium, but do not harm other tree species.
Hemlock fluting	Western hemlock	Southeast Alaska	Fluted hemlock trees have deeply incised grooves and raised ridges that extend vertically along their boles. Fluting causes bark to be buried internally in wood and results in commercial loss of wood quality and quantity. Incidence does not fluctuate from year-to-year. Fluting does not appear to be caused by any insect or pathogen.
Porcupine *Erethizon dorsatum*	Shore pine, Sitka spruce, Western hemlock	Southeast Alaska	Porcupines caused considerable bole damage and mortality in commercially important young-growth stands in Southeast Alaska. Damage was severe on Mitkof Island, but scattered porcupine feeding occurred throughout the range of the animal. Basal scarring was common on larger, older trees in many areas. Shore pine was heavily damaged in the Haines area.

Part 3 Indexes

Index - Insects

(Forest Insect and Disease Conditions in the United States 1991)

The common and scientific names of the insects come from "Common Names of Insects and Related Organisms," published in 1982 by the Entomological Society of America, and two U.S. Department of Agriculture publications: "Western Forest Insects" (Miscellaneous Publication 1339; 1977) and "Insects of Eastern Forests (Miscellaneous Publication 1426; 1985).

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Index - Diseases

(Forest Insect and Disease Conditions in the United States 1991)

The common and scientific names of the disease-causing organisms are based on the compendium entitled "Common Names for Tree Diseases in the Western United States and Western Canada" by Hawksworth, Gilbertson, and Wallis (a 1985 supplement to the proceedings of the 32nd annual Western International Forest Disease Work Conference) and "Diseases of Forest and Shade Trees of the United States" by George Hepting (Agriculture Handbook 386; 1971). Based on continuing taxonomic research, many scientific names have been changed.

The Center for Forest Mycology Research at the Forest Service's Forest Products Laboratory in Madison, WI, is the information source for name changes.

Synonyms of recently changed names are in parentheses in the disease sections in Part II; anamorphs are shown in brackets. This differentiation is not made in the index.

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